TECHNOLOGY DEPT.

Gas Journal

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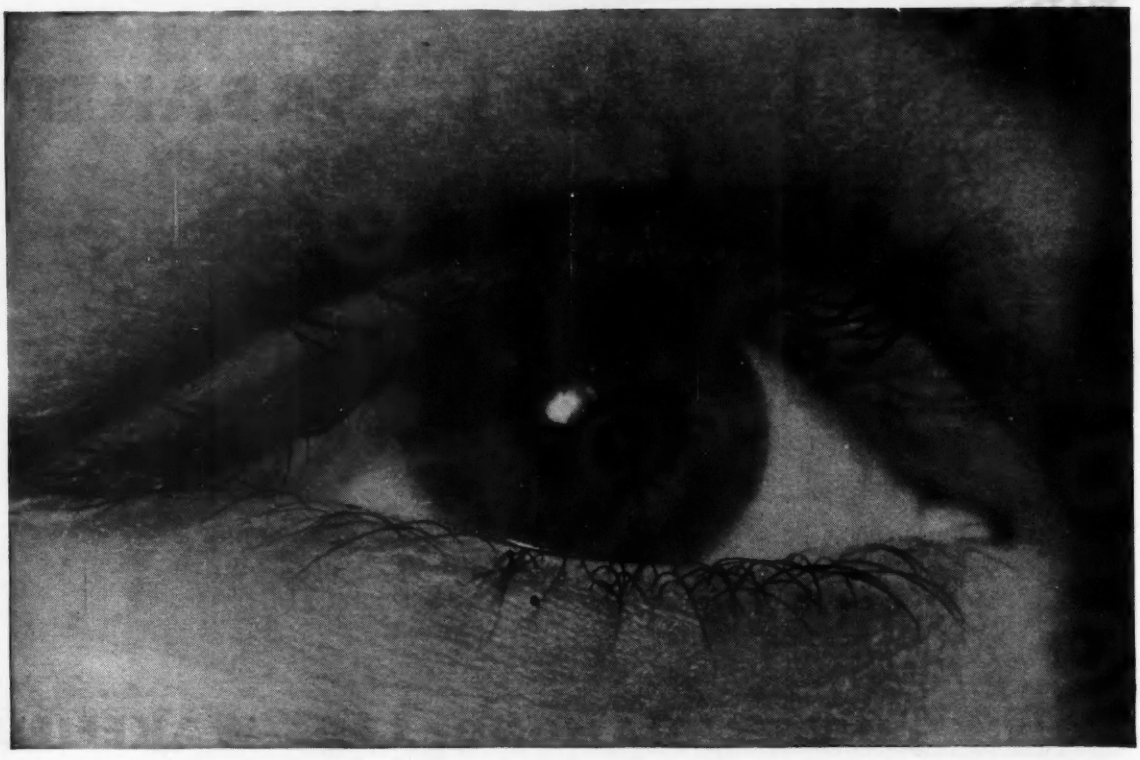

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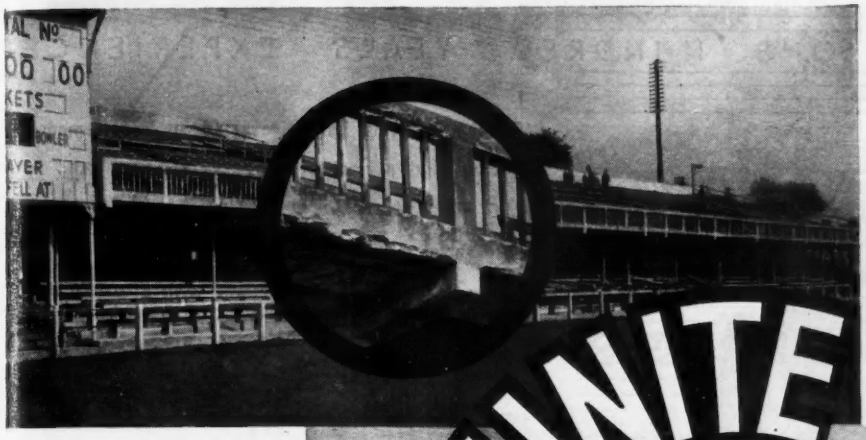

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Estimates given for encasing structural steelwork and covering the wearing surface of chutes and bunkers.

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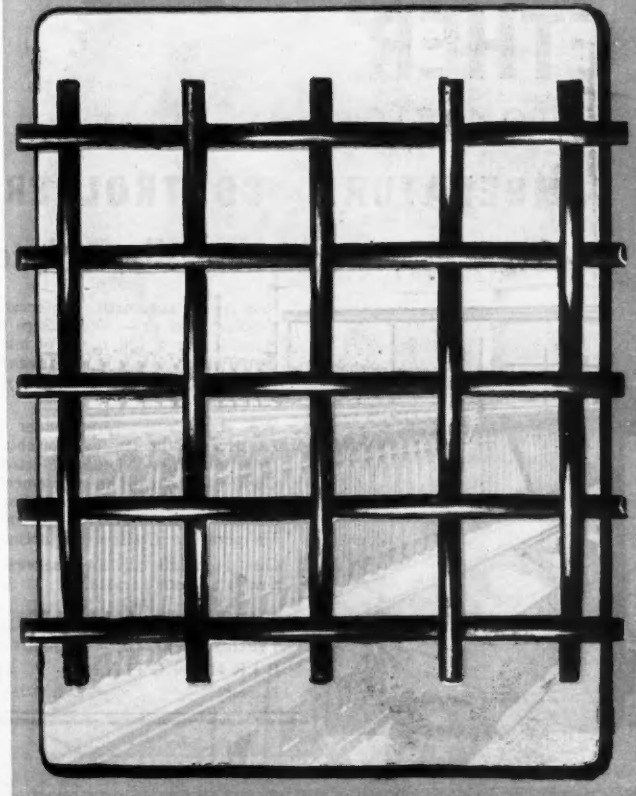

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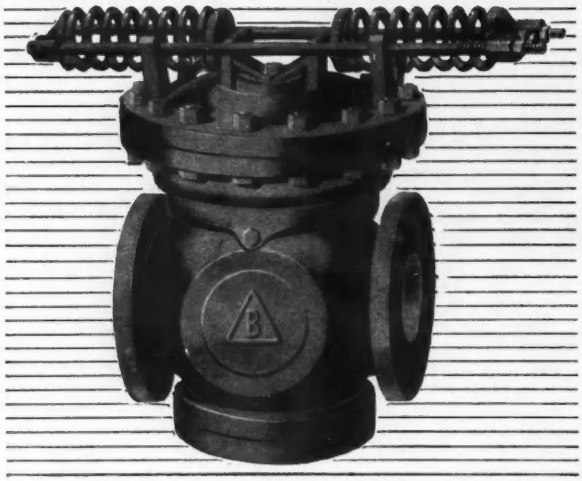

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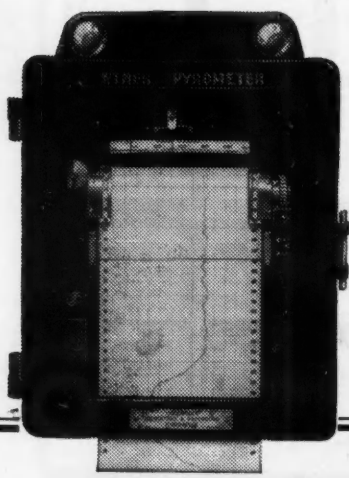

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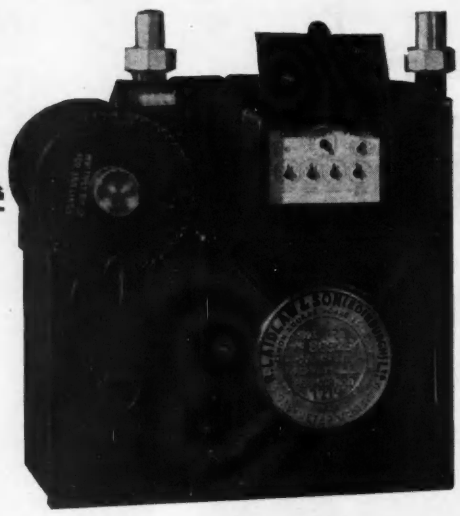

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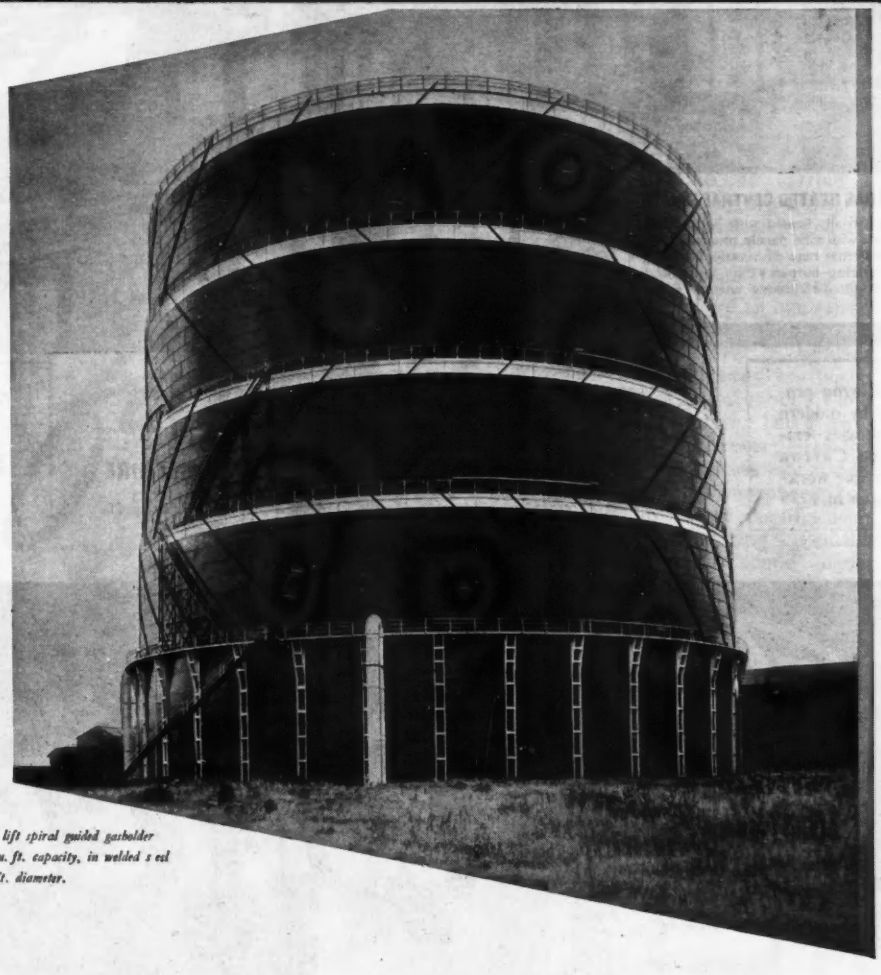

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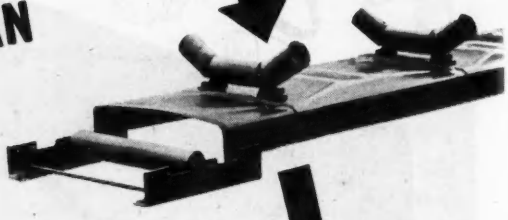

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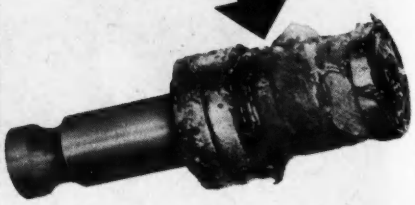

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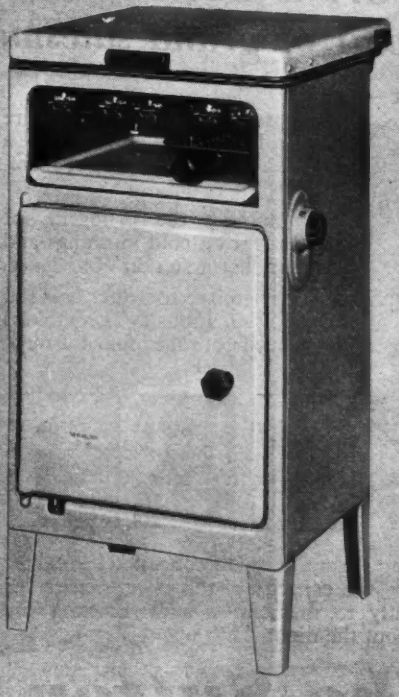

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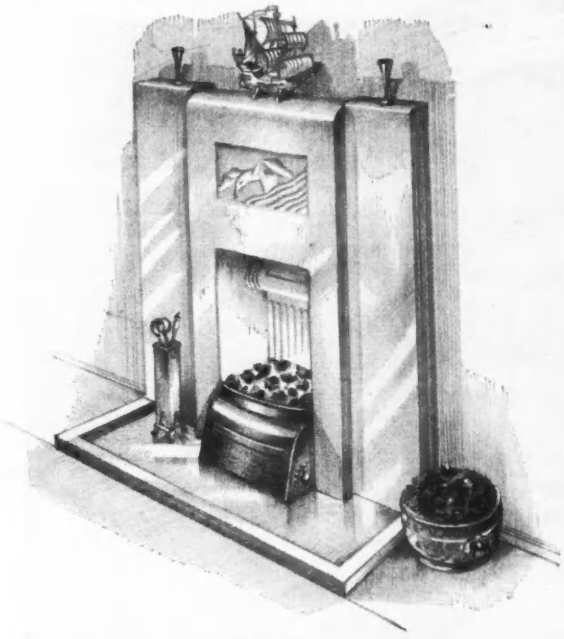

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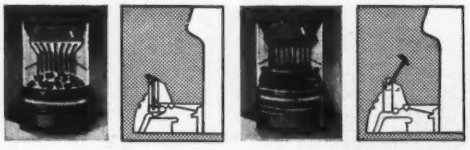

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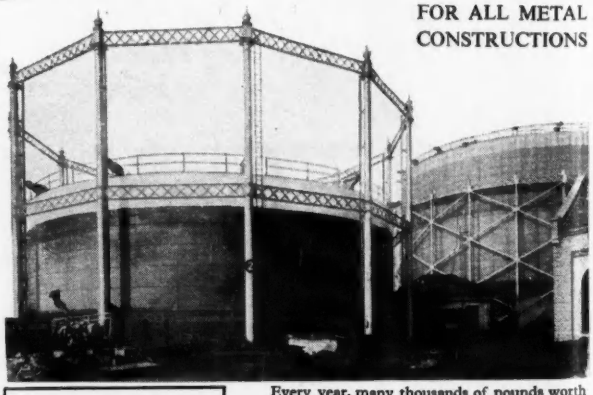

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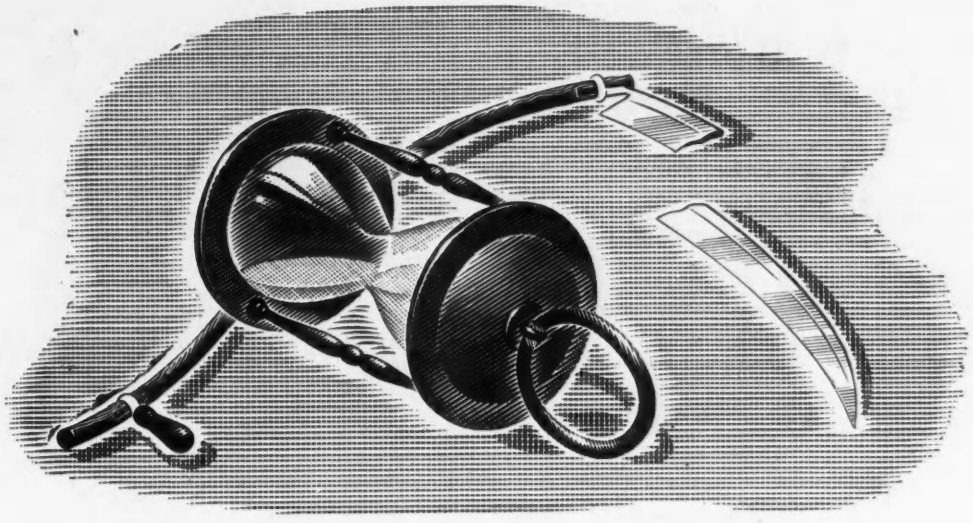

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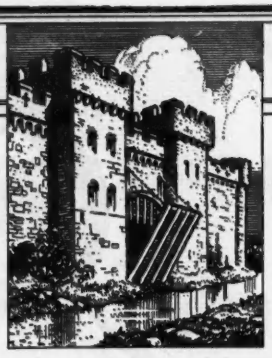

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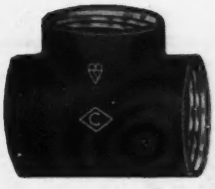

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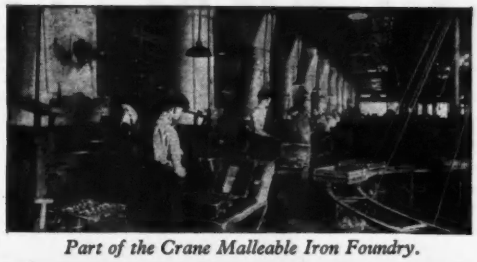

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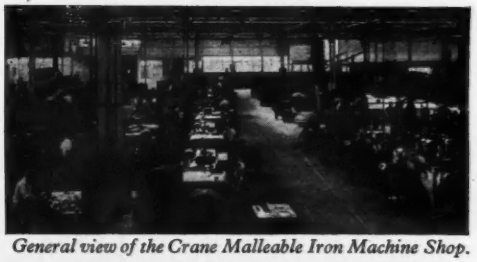

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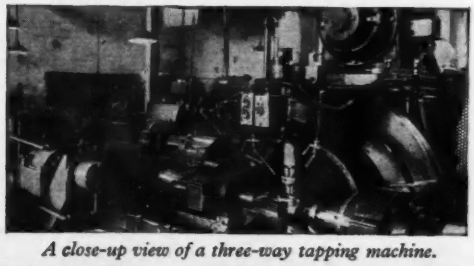

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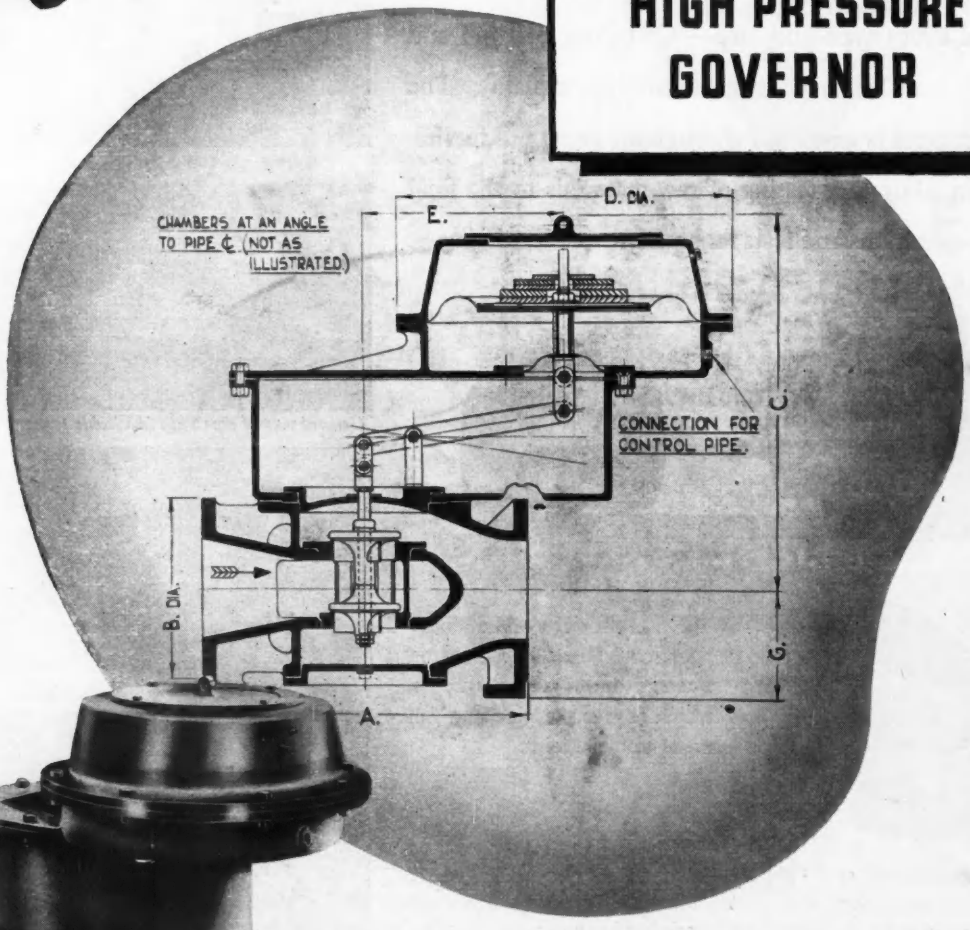

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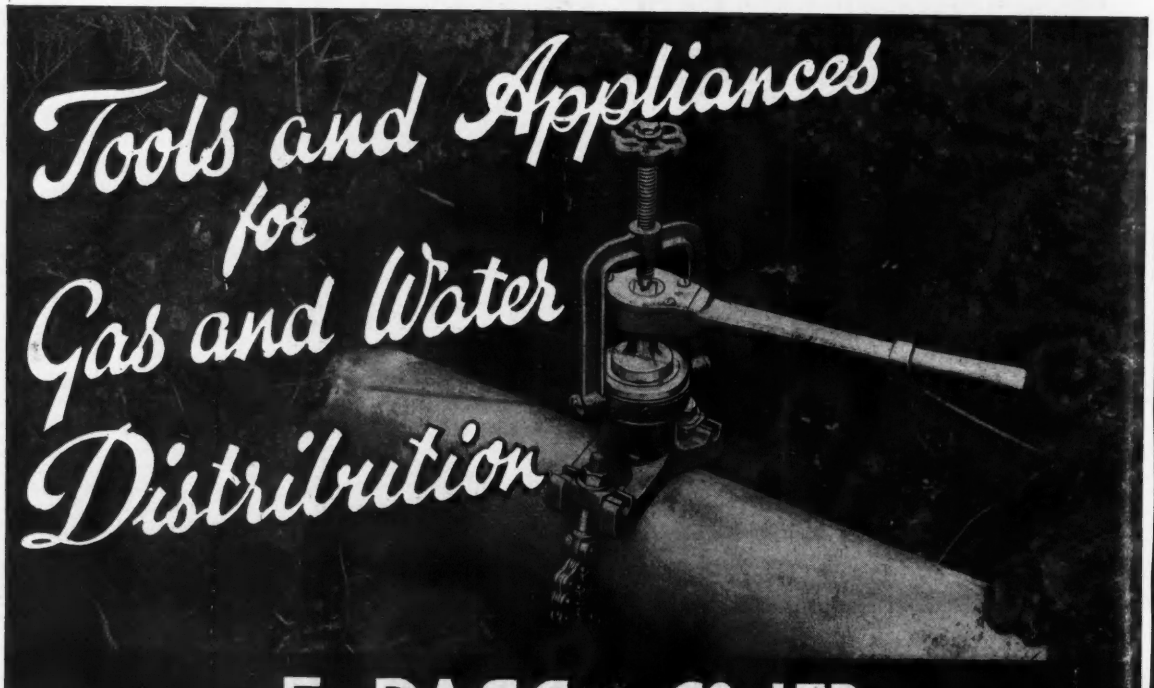

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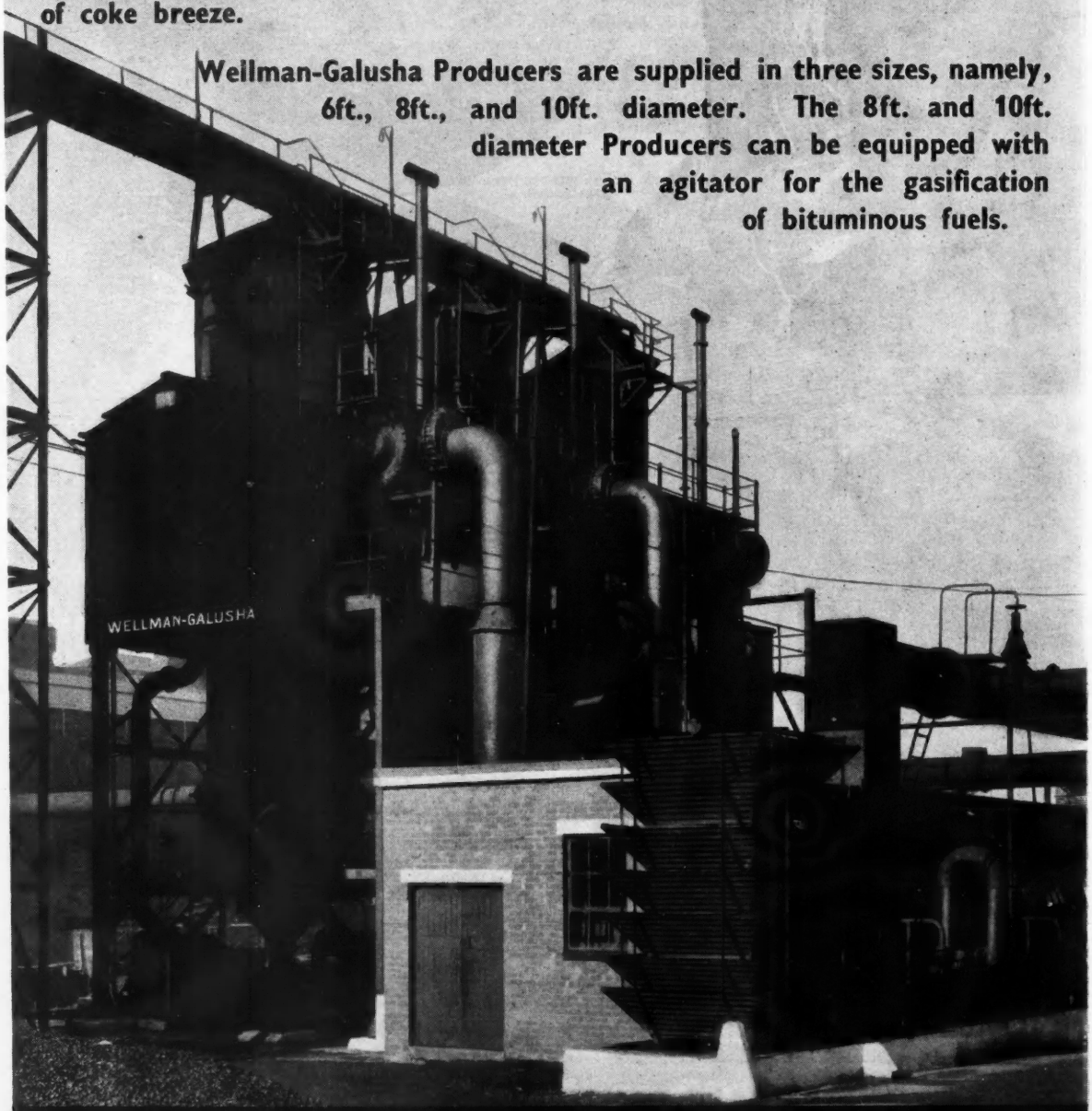

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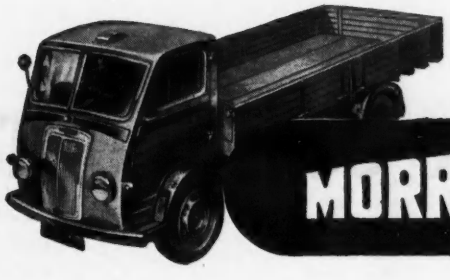

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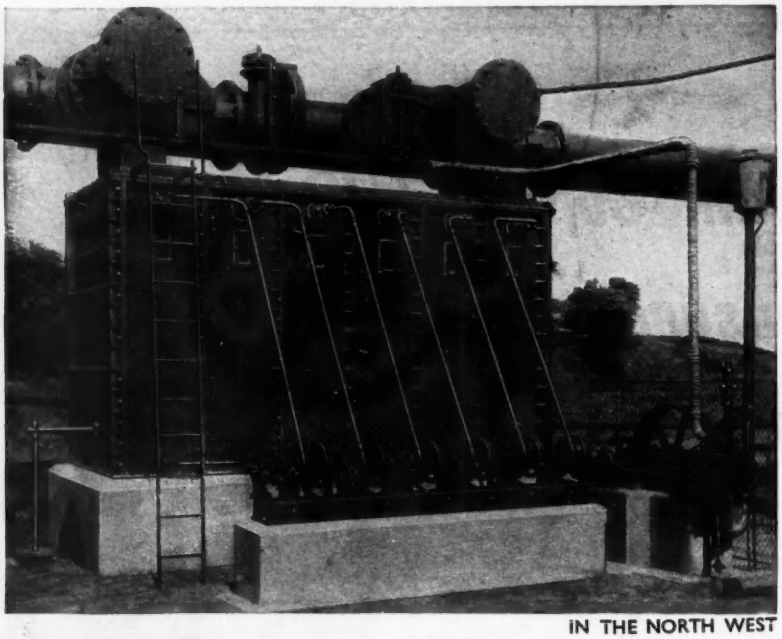

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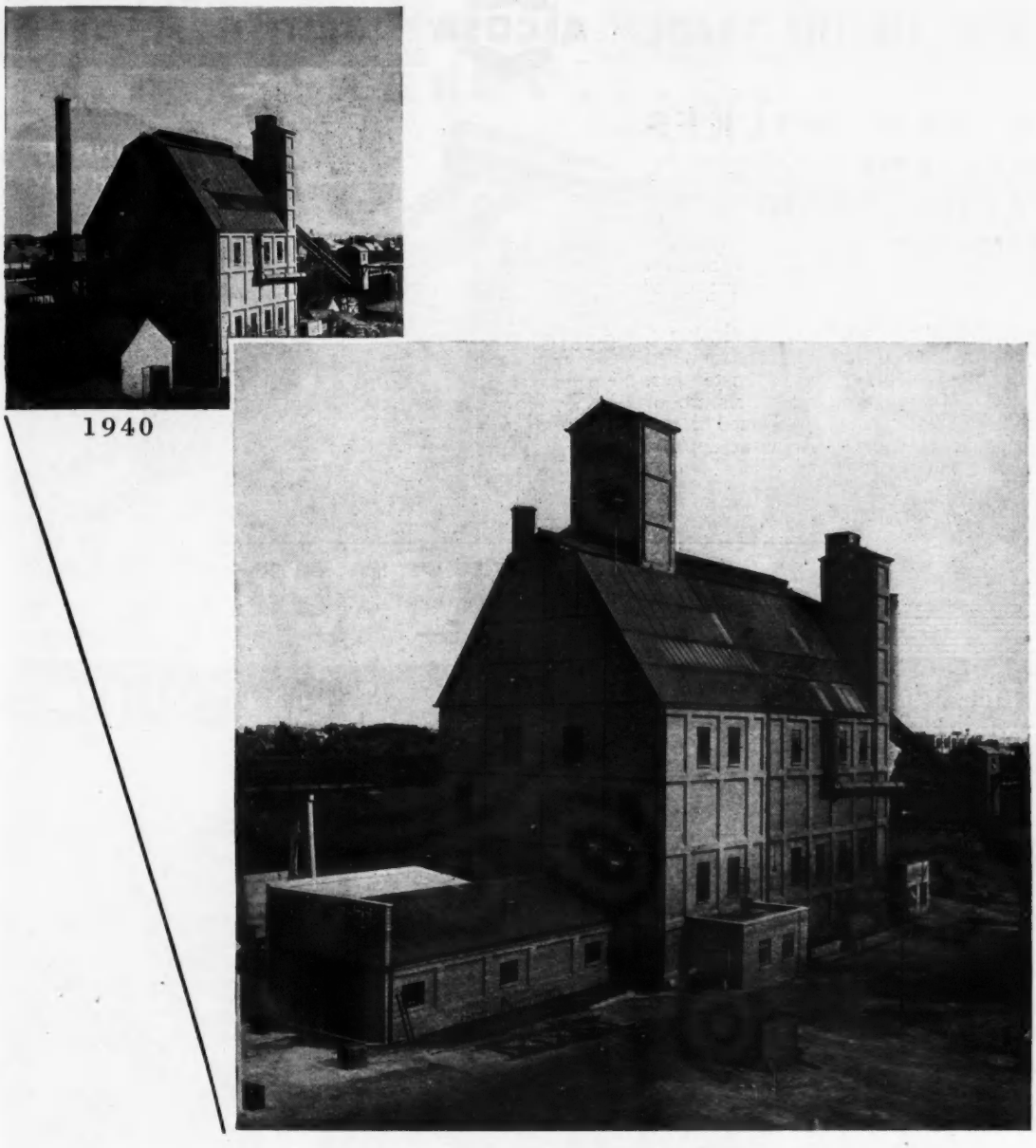

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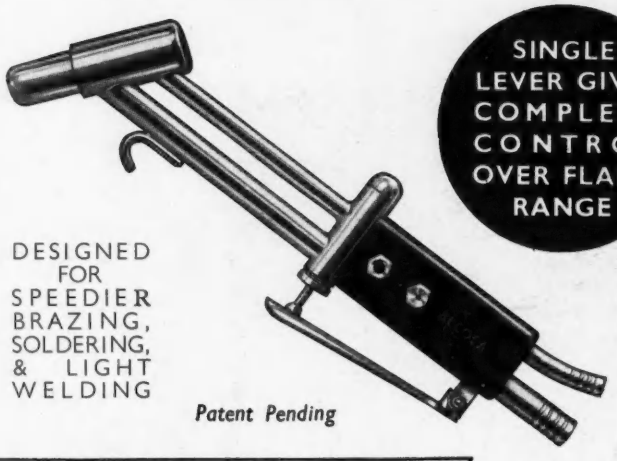

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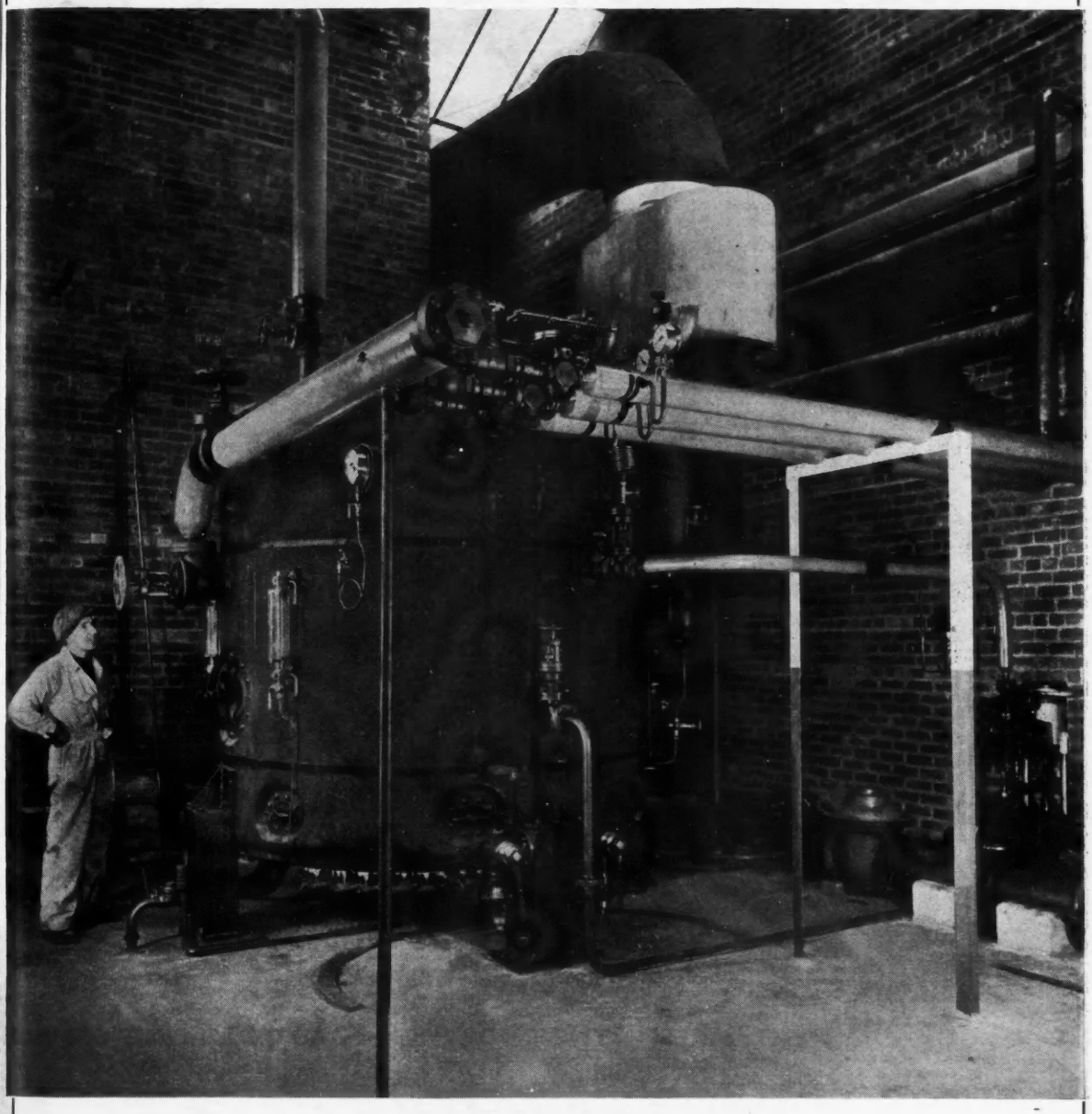

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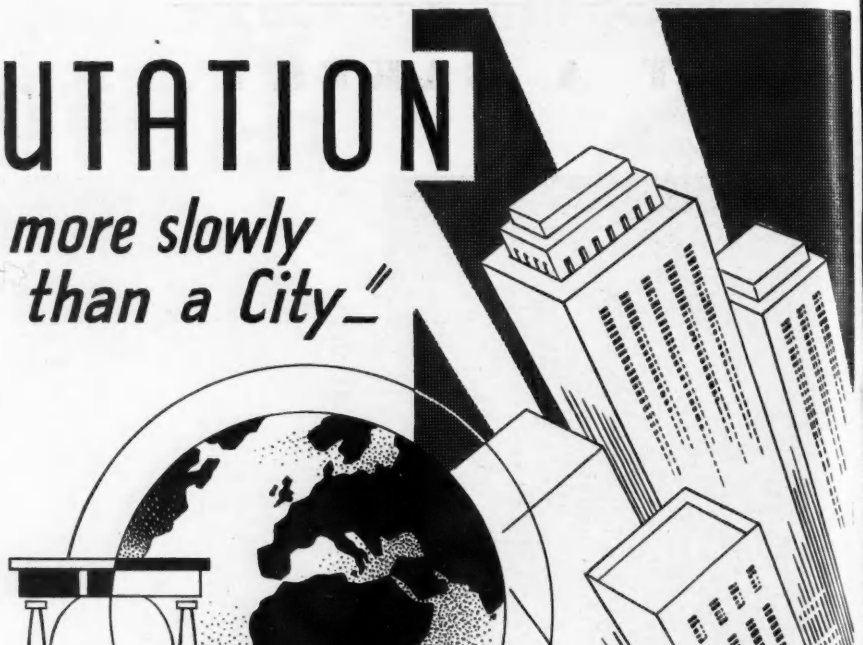

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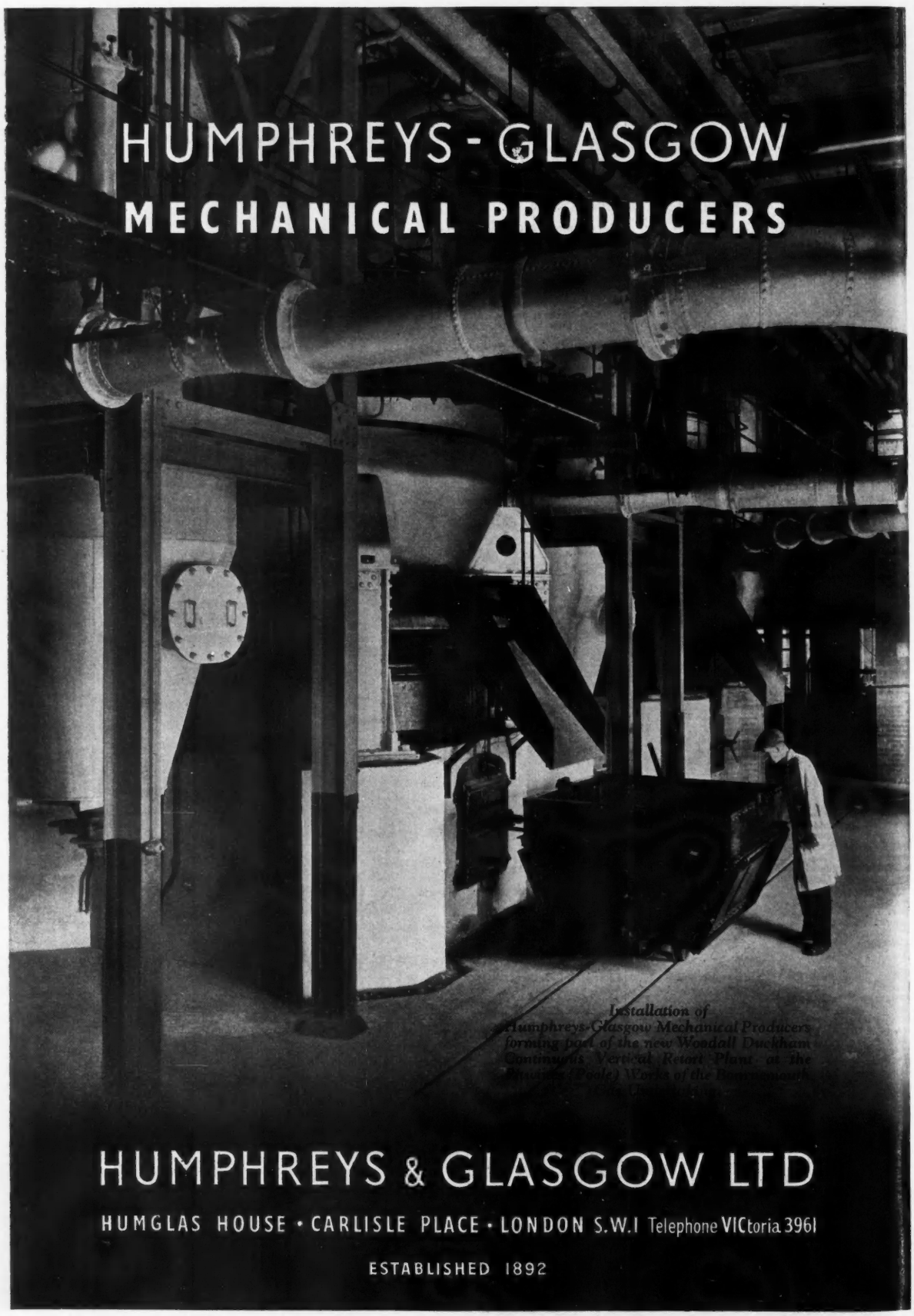

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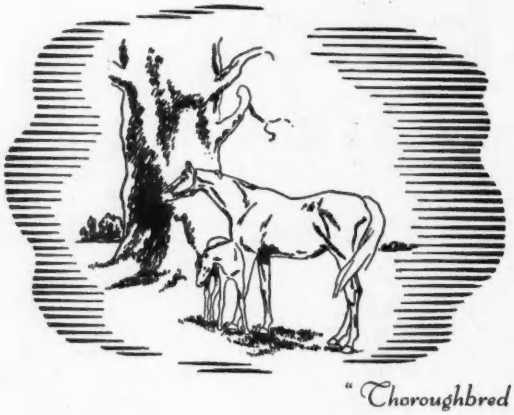

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GAS JOURNAL

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GAS INDUSTRY STATISTICS

ON later pages we publish two tables from the Ministry of Fuel and Power Statistical Digest, 1948 and 1949. They summarise both operational and financial activities of the gas undertakings vested in area gas boards, setting out the figures relevant to each board for 1948 and giving certain particulars (these being in the operational section) for 1949. Additional statistics relate to railway and transport gas undertakings. Before we spotlight a few of the figures, it would be useful, we think, to trace in barest outline the gas industry's 'statistical history.' Returns to the order of the House of Commons gave particulars for statutory gas undertakings for as far back as 1820; regular annual statistics on a national basis started in 1882. The Gas Regulation Act, 1920, required statutory undertakings to make such returns to the Board of Trade as the latter might require, and the Gas Undertakings Act, 1934, made it obligatory on non-statutory undertakings to render particulars of their supplies of gas. Since 1942 the annual returns for the industry have been collected by the Ministry of Fuel and Power, and for 1948 the annual returns were revised and placed on a basis comparable with those of the other fuel and power industries. Nationalisation of the industry has resulted in the discontinuation of the Ministry's 'Return' which gave particulars for each company and local authority undertaking. The national statistics hitherto given in that publication are now set out in the Digest. (The last issue of Part II of the 'Return,' giving financial particulars, referred to 1937 and was published in 1939. The last issue of Part I, dealing with the manufacture and supply of gas, covered 1947, and was published in September, 1949. One of the tables in the new Digest is an historical background (1921-1948) which can only be drawn up on the basis of statutory undertakings.) Besides the Ministry's Digest the sources of annual statistics of the gas industry will come from the annual reports and accounts of the Gas Council and area gas boards.

For reasons which are widely known the gas industry is having to hold back on demand; through shortage of plant and for other reasons it cannot develop properly some of the loads eagerly sought by the potential consumer. But the nationalised industry grows, and in 1948 it supplied 11,703,000 consumers with 465,137 mill. cu.ft. of gas. Comparable figures in 1938, the year before the war, were 11,215,104 consumers supplied with 313,664 mill. cu.ft. In 1938 the gas industry bought 30,000 mill. cu.ft. of coke oven gas, in 1948 double this quantity; and yet, even today, over 5,000 mill. cu.ft. of coke oven gas is being bled or burned to waste. The figures have added interest when they are broken down (as they are in the two tables we give) into each of the 12 area boards. At one end of the scale we have the North Thames Gas Board with 12 undertakings, 1,749,000 consumers, and gas sales at 65,464 mill. cu.ft.; at the other, the Wales Gas Board with 104 undertakings, 404,000 consumers, and gas sales at 13,391 mill. cu.ft. We are not thinking in terms of Goliath and David. The area of the North Thames Gas Board is only 900 sq. miles, that of the Wales Gas Board 8,000 sq. miles. And the Scottish area, which covers 30,400 sq. miles, comprises 190 undertakings. What we have in mind is the great variation which exists in the conditions governing each area and in consequence affecting policy; and it is good to see that the Ministry of Fuel and Power has continued to break down overall figures into area statistics. However, the tables we give are for our readers to study, as also is the Digest itself, which contains more authentic published information about the gas industry as a whole (as distinct from individual undertakings, figures for each of which were formerly set out in the 'Return') than ever before.

Finally we would mention that within the same covers are the figures for the coal industry, the electricity industry, coke ovens and coke distribution (both hard coke and gas coke), and petroleum. The drafting of the Digest has, in fact, been planned to secure greater comparability in the statistics for the fuel and power industries. The Digest is obtainable from H.M. Stationery Office, price 7s. 6d.

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15-YEAR COAL PLAN

LAST week the National Coal Board published its 15-year programme involving an estimated expenditure of £635 mill.—£520 mill. on colliery development and £115 mill. on coke ovens and other ancillary undertakings—with the larger part falling in the early years. The proposals have to be discussed first with the National Consultative Council and then with the Minister of Fuel and Power. The plan is also to be placed before the consumers' councils. The over-riding consideration will be whether the sum envisaged is in reasonable proportion to the needs of investment for other industries, including the gas industry. It is trite to say that this is a matter of far-reaching responsibility, and equally trite to remark that publication of the plan comes at a time when great anxiety is being felt regarding coal output to fulfil the coming winter's demand—and all this apart from rearmament. Broadly, the plan seeks to provide more coal from fewer collieries to meet an estimated total demand of 240 mill. tons a year from 1961 to 1965, an increase of one-fifth over present production. It is emphasised that the execution of the plan will be in the hands of local managements.

According to the proposals, it is 'probable' that over 250 of the 950 collieries now in production will be reconstructed and that they will yield nearly 70% of all coal required. A score of new large collieries and about 50 new drift mines will account for another 10% of the industry's total production, while the remaining 20% will come from some 250 collieries continuing in their present state without big technical reorganisation. Between 350 and 400 pits may cease to have a separate existence; 90 of them may be absorbed in schemes of concentration; the rest are mostly small pits 'which are nearing exhaustion or are unlikely even to be able to produce coal economically.' It is put forward that 10 or 15 years from now the reconstructed industry should need 80,000 fewer mineworkers than are employed at present, the reduction being brought about by excess of wastage over recruitment. As a 'cautious estimate' it is suggested that the plan would result in a saving of 7s. per ton of coal. Over the 16-year period—from 1950 to 1965—the Board's estimated capital expenditure under the plan works out at about £40 mill. a year.

The foregoing is the briefest of summaries of the National Coal Board's 15-year plan; and throughout it is emphasised that the plan is not a rigid one and there are many uncertainties. It is a plan to have continuous revision as more becomes known about the reserves of coal, as new developments occur in mining technique, as new inventions prove themselves, and as trends in demand and manpower declare themselves. Manpower is the most important problem, and the Board aims to man the industry to meet the normal demand with a five-day week and a stable labour force. In the meantime the fall in manpower at the coal face is—as the Minister of Fuel and Power admitted in the House of Commons last week—causing both the Board and the Government 'particular concern.' At a Press conference on November 14, Lord Hyndley, Chairman of the Board, said that the plan did not allow for new technical improvements, and so, although they were faced with a severe manpower shortage today they could not say there was likely to be one in the long run. In fact, the report offers substantial reassurance to those entering the industry now.

Coal has been described as the lifeblood of the nation; it is certainly the most important factor influencing the gas industry, and the 'Plan for Coal' is obviously of first interest to the industry. One chapter of the report explains how the plan was made. Having discussed demand, it concerns itself with prices. The N.C.B. has adopted the principle that in the long run the prices of particular coals delivered in market zones should, as far as practicable, cover the cost of producing and delivering those coals. At the same time prices will to some extent be determined by the inherent qualities of the coals and by the 'strength of consumers' demands and preferences for the different kinds of coal.' This, of course, has bearing on the gas industry's choice of carbonising plant. The principle the Board proposes to follow implies not only a price policy but a policy of shaping production so as to meet consumers' demands most economically. 'Price policy and production policy,' it is stated, 'will go hand in hand. By pricing each main type of coal in each market zone as nearly as possible in accordance with the costs of production and transport, the Board will be calling upon each group of consumers to defray the true costs to which their consumption gives rise.' For many generations there is unlikely to be a shortage of coal as such underground. There will, however, be increasing difficulties in the way of mining the coal economically, and these difficulties will be acute for certain special kinds and qualities of coal, notably those best suited for the making of hard coke. 'All the indications,' states the report, 'are that the cost of mining these special coals will be high, and unless the demand for them can be limited by changes in distribution and utilisation, will be higher still.' The assumption is made by the Board that over a long period price incentives, better distribution of special coals, and improved technique of utilisation—including greater use of blends—will lead to replacement of much of the special kinds and qualities by other coals. In the shorter period of the plan it has been assumed that there would be changes such as would limit production of special qualities at high cost. The report refers to the reconstruction schemes of the gas boards, commenting that when more is known about these schemes there will be a firmer basis on which to estimate the demand for gas coal. 'What is already clear'—we quote from the report—'is that an increasing demand for this coal must be expected and *provision has been made to meet it*.' The italics are ours.

According to the plan, coal output is to be increased mainly in parts of Scotland, East Durham, Yorkshire, East Midlands, North Staffordshire, South Wales, and the small coalfield of Kent. Most of this development would increase the output of coals suitable for gas-making. And reading the 'Plan for Coal,' particularly Technical Appendix I, 'Reserves of Coal,' our mind reverted at once to the paper which Dr. J. G. King, Director of the Gas Research Board, presented at the annual meeting of the Institution of Gas Engineers in 1948. Important as it was at the time, that contribution has, we suggest, added importance today in the light of trends during the past

two years and in view more immediately of this new 15-year programme put forward by the N.C.B. In the interests of economy in the purchase of coal and the most efficient use of the qualities of coal available, the 'Plan for Coal' should be read in conjunction with Dr. King's Institution paper, a substantial abstract of which was published in the *Journal* of August 4 and August 11, 1948.

PUBLIC WORKS

THE Public Works, Roads, and Transport Congress and Exhibition was first held in 1919. The Public Health Congress and Exhibition was first held in 1928. Both exhibitions were held in alternate years before the war, and since then have been held only once. This post-war period is remarkable for—among other things—the fact that there are far too many national exhibitions and among them too large a degree of overlapping. What better then than an amalgamation of these two cumbrously titled events? The result of this union appeared last week, all the better for the coalition but, alas, bogged down with a title as long and as difficult to memorise as those of its forbears.

The Public Works and Municipal Services Congress and Exhibition was held at Olympia, occupying the Grand and National Halls with 250 exhibitors, and illustrated the extraordinary range of products covered by this enlarged field. Exhibits ranged from road and bridge construction machinery, through the intricacies of building, sewage, fire control, and public parks, to labour-saving devices for the office. In the midst of all this the gas industry played a relatively prominent part. There was, for example, the major contribution made by gas to comfort and efficiency in the modern school, the importance of adequate street lighting ,the suitability of coal tar for road surfaces under a variety of conditions, and the processes of catering, greenhouse heating, clothes drying, and incineration. In fact, Gas had a good story to tell. That it was told lucidly, attractively, and convincingly, credit must be given to the Gas Council, whose stands, one of the best in the show, was admirably designed to exercise the maximum appeal to visitors. It had little enough competition from the electrical industry, for the E.D.A. exhibit was tucked away in a gallery *cul-de-sac* where it caught only the most adventurous visitors and those who had lost their way.

The multiplicity of exhibitions today must, we imagine, give the participants some misgivings. In what exhibitions can we afford to participate? ' becomes ' What exhibitions can we afford to ignore? ' In other words, there exists among potential exhibitors a vicious circle which compels them, often against their better judgment, to rent expensive space, erect expensive stands, and enter upon expensive publicity campaigns which they can ill afford; boycotting would seem to be the only solution and this is not always practicable. The Public Works show, however, was not one likely to cause undue anxiety to exhibitors, for it provided an audience behind which lay buying power on a mighty scale. Clearly the Gas Council recognised the possibilities and potentialities of representation at this widely and influentially attended function, and gave careful thought to its specialised requirements. As an industry we should be thankful that this national publicity service displays such versatility in the light of the many individual themes of the exhibitions in which it participates. In little more than a month gas has taken the stage at exhibitions dealing with laundering, brewing, dairying, and now local governing. Behind these appearances there is surely a mass of hard work and, even more important, a keen appreciation of what gas can and must do in industry, on the land, and in the homes of the people.

The Public Works and Municipal Services Congress and Exhibition is reviewed at length elsewhere in this issue, and some indication is given of those Congress papers likely to be of interest to readers. There are several, and undoubtedly the reason lies in the inclusion, as a member of the Organising Council, of the Institution of Gas Engineers.

A ROYAL VISIT

HIS Royal Highness the Duke of Gloucester has promised to visit the East Greenwich works of the South Eastern Gas Board on December 7 to inaugurate the first section of a new coke oven plant erected at a cost of £2,800,000. There have been three royal visits to Beckton in recent years—one by the late King George V to open the coal handling plant in 1926; the second by the Prince of Wales (the present Duke of Windsor) to open new coke ovens in 1932; and the third by the Duchess of Kent to open a further battery of coke ovens in 1948—but this is the first recorded occasion of a royal visit to any works in the area of the South Eastern Gas Board or its predecessors.

DE-NATIONALISATION IF . . . ?

ACCORDING to *The Times* of November 16, the Conservative Parliamentary Fuel and Power Committee has appointed a sub-committee to make recommendations about the future of the gas industry. Mr. Victor Raikes is chairman of this sub-committee, and other members are Major P. G. Roberts, Col. Crosthwaite-Eyre, and Sir William Darling. Terms of reference include consideration of a scheme for partial or complete de-nationalisation of the gas industry. Enquiry at the Party's Central Office produced the information that the sub-committee is now sitting but that no further statement will be issued until they have sifted all the evidence and produced their report. This report will be awaited with considerable interest, though we doubt whether, in the meantime, those engaged in furthering the progress of the nationalised gas industry *vis-à-vis* the nationalised coal and electricity industries will be unduly alarmed.

TROTTER-PATERSON MEMORIAL LECTURE

The Illuminating Engineering Society has founded a lecture in memory of two of its distinguished former members, Mr. A. P. Trotter and Sir Clifford Paterson. The first Trotter-Paterson Memorial Lecture is to be given by Dr. J. W. T. Walsh of the National Physical Laboratory on January 17 at the Royal Institution. The title will be 'The Early Years of Illuminating Enginering in Great Britain.'

A limited number of tickets has been made available to members of the Institution of Gas Engineers and may be obtained on application to 17, Grosvenor Crescent, S.W.1.

Costs of production have risen to such an extent over the past nine months that we have had to increase our Subscription Rates. The new rates will operate from the beginning of 1951 and are as follows:—Home and Empire 52/-. Foreign 60/-. The rates include postage. As before subscribers will receive free a copy of the *'Journal'* Calendar and Directory.

Personal

Mr. **L. C. Coleman** has been appointed Group Distribution and Sales Manager of the Bury St. Edmunds Group, Eastern Gas Board.

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Mr. **Leslie Hardern,** Public Relations Officer to the North Thames Gas Board, has joined the Board of Management of the School of Planning and Research for Regional Development.

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Miss **M. K. Gompertz,** M.C.A., of R. & A. Main, Ltd., well known throughout the country as demonstrator, has recently retired. Miss **H. Zvegintzov,** Diplomeé, Cordon Bleu (Paris), M.C.A., has succeeded her as Chief Demonstrator.

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Mr. **Leslie O'Connor** (National Coal Board) and Sir **Walter Benton-Jones,** BT. (Chairman, United Steel Companies, Ltd.), have been appointed Chairman and Deputy Chairman respectively of the British Association of Coke Oven Tar Producers.

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Mr. **F. Allen,** Group Manager, Clacton, has become Manager of the newly-amalgamated Colchester and Clacton groups of the Eastern Gas Board, following the death last July of Mr. M. L. Smith, of Colchester. Mr. **R. W. Hilham** (Secretary of the Eastern Junior Gas Association) has become Group Distribution and Sales Manager of the combined group.

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Mr. **C. H. Sparks,** who has been Chief Engineer of Babcock & Wilcox, Ltd., since 1936, is retiring from that position at the end of this year. He will continue as a Director and will also continue to serve the Company in a consulting capacity. Mr. **W. F. C. Schaap,** at present Deputy Chief Engineer, will be appointed Chief Engineer as from January 1, 1951.

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Mr. **R. C. Lingley**, Secretary of the Colchester undertaking, has retired after 43 years' service. He joined the former Colchester Gas Company in 1907 and at the end of the first world war he was associated with the late Mr. W. W. Townsend in the setting up of the Eastern District of the National Gas Council and Federation of Gas Employers and the Eastern Regional Joint Industrial Council. For the past 23 years he has been largely concerned with the management of the Colchester sports and social club. He was appointed Secretary of the Company in 1930 and retained an equivalent position under the Eastern Gas Board until his retirement.

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Sir **Frederick Bain,** M.C., has been elected an Hon. Member and Hon. Vice-President of the Association of British Chemical Manufacturers in recognition of his long and distinguished services to the Association and the chemical industry. When Sir Frederick would normally have been elected to the Chair of the Association, he was called upon to assume the Presidency of the Federation of British Industries. In view of his increasing responsibilities and commitments since that date, he has felt unable to undertake the additional responsibilities implied by the chairmanship of the Association. This appointment by the Association will enable him to retain his membership of the Council and his close association with and support of the work it is doing for the chemical industry.

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WEST MIDLANDS APPOINTMENTS

The West Midlands Gas Board announces the following appointments: R. C. Coltman (formerly Fittings Superintendent, Coventry), to be Divisional Domestic Sales & Service Superintendent, Warwickshire. G. P. McLennan (Hull), to be Senior Draughtsman, Cannock, Lichfield and Rugeley Group. E. K. Eastabrook (Portsmouth), Sales and Service Superintendent, Walsall District. S. C. Crathorn (Birmingham), Assistant Engineer, Swan Village Works, Birmingham. F. C. Barker (Windsor Street), Technical Assistant to Divisional Engineer, Birmingham Division. G. E. Brooke (Swan Village), Third Engineer, Water Gas, Windsor Street, Birmingham. J. H. Welsh (Swan Village), First Assistant, Swan Village. S. G. Reynolds (Saltley), Assistant to Superintendent, Central Test Works, Nechells.

Obituary

Mr. **Norman J. Bowater,** O.B.E., B.SC., a Director of Gas Chambers and Coke Ovens, Ltd., died suddenly at his home on November 8.

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Mr. **Charles Higgs,** for many years works foreman at the Wantage Urban District Council's gas undertaking until he was taken ill in 1943 and retired, has died at the age of 74.

Diary

Nov. 25.—Scottish Junior Gas Association: Visit to works of Glenfield and Kennedy, Ltd., Kilmarnock.

Nov. 28-29.—Institution of Gas Engineers: Autumn Research Meeting, London.

Nov. 30.—North Thames Gas Consultative Council: Westminster City Hall, Charing Cross Road, 2.30 p.m.

Dec. 2.—Scottish Junior Gas Association (Western District): Joint Meeting with Eastern District, Heriot Watt College, Edinburgh. Paper by G. V. C. Davies (Humphreys & Glasgow, Ltd.).

Dec. 5.—London and Southern Section, Institution of Gas Engineers: 'Domestic v. Industrial Cost per Therm,' H. Bromley, Western Divisional Distribution Engineer, Southern Gas Board. Institution of Gas Engineers, 17, Grosvenor Crescent, 2.30 p.m.

Dec. 5.—Institute of Fuel: Opening meeting of Study of Drying. 'Some Fundamental Aspects of Air-Drying of Solids,' by R. Hendry and Dr. A. W. Scott; 'The Determination of Moisture in Coal,' by E. G. Barber; 'Methods of Estimating Moisture,' by A. H. Ward. Institution of Mechanical Engineers, Storey's Gate, S.W.1, 5.30 p.m.

Dec. 6.—Southern Gas Consultative Council: Firs Hotel, Bournemouth, 11.30 a.m.

Dec. 7.—Industrial Gas Development Committee: Gas Industry House, 9.30 a.m.

Dec. 8.—Northern Junior Gas Association: Short Paper meeting, Darlington.

Dec. 8.—London and Southern Junior Gas Association: 'Aerated Gas Burners,' E. E. Blandon and J. V. Rigg, 178, Edgware Road, W.2, 6.30 p.m.

Dec. 12.—Wales and Monmouthshire Junior Gas Association: Meeting, Aberdare. Paper by D. T. Phillips (Mountain Ash).

Dec. 12.—Midland Junior Gas Association: Meeting, Birmingham. Paper, 'Thirty Years of Carbonisation,' J. Foxton (Cheltenham).

Dec. 16.—Yorkshire Junior Gas Association: Short Paper Meeting, Bradford.

GALASHIELS TO BE CENTRE OF GAS SUPPLY

Galashiels is to become an important centre of gas production in the Borders, providing the source of supply to Melrose, St Boswells, and Selkirk, in addition to many small villages in the area.

The Galashiels gasworks are at present being extended, and it is expected that the work of main laying to connect Melrose and St. Boswells will be started next summer. A main already connects Selkirk and Galashiels. In due course the Melrose gasworks will be closed down. It is expected that the Selkirk works will also eventually be closed.

The cost of the whole scheme is likely to be in the region of £150,000. It is anticipated that the output of residual products will be considerably stepped up, and a new coke screening and grading plant is included in the plans of extension. It is expected that in a few years' time coke production will have risen from 6,500 tons to 10,000 tons.

3,650 Years of Service

A TOTAL of 3,650 years of service was celebrated at a dinner at Diamond Foundry, Luton Production Centre of Radiation Ltd. (the Davis Gas Stove Co., Ltd.), when 76 employees, one a woman, received engraved gold watches in recognition of their long service with the company.

Mr. Kenneth Davis, proposing a toast to the veterans, reviewed the history of the firm, which dates from 1868, and manship and products which had such a high place in the industry. He, too, looked back over the history of the firm and mentioned in particular the development of its labour relations, with which he had, for many years, been personally concerned. He instanced the various welfare projects which the management had initiated and still continued in spite of the greatly increased statutory schemes. 'With so many here

Some of the 200 guests at the dinner at which 76 veterans were presented with gold watches. At the top table are, left to right: Mrs. H. Bourke; Mr. F. Blackwell, former Works Manager; Mr. W. A. Worton, Works Director, and Mrs. Worton; Mr. L. H. N. Davis, brother of the Chairman; Mrs. A. W. N. Davis, mother of the Chairman; Mr. J. Kenneth N. Davis, Chairman and Managing Director, and Mrs. Davis; and Mrs. J. R. Lumb and Dr. Lumb, Works Medical Officer.

called it a 'family' business. By this he meant not only the Davis family, but also all the other families who had contributed grandfathers, fathers, sons, brothers, cousins, etc., to the many departments through the years. At present there were no fewer than 293 people in the company's employ who had at least one other close relation working there.

Replying to the toast, Mr. Bert Farrow, J.P., said that he and his fellow veterans were proud of the Diamond Foundry; they called it 'our' firm and they were proud of their craftstonight with such an impressive record, this cannot be a bad firm to work for!' he said.

Dr. Davis then presented the gold watches, saying a few words to each employee. Prolonged applause greeted them all —particularly Mrs. Mabel Morris, the only woman with the qualifying years of service.

The evening ended with an entertainment by Ted and Barbara Andrews, the well-known radio stars, and community singing culminating in 'Auld Lang Syne.'

Irish Gas Statistics

Preliminary figures of the 1949 Census of Industrial Production in the Republic of Ireland have just been published in the *Irish Trade Journal*.

Twenty-five gas undertakings are reviewed, against 28 in 1948. The gross output of coal gas and water gas in 1949 was 22,320,758 therms, with a net selling value of £1,868,156. There were also manufactured 86,392 tons of coke and breeze, valued at £476,290. The total value of goods made and work done is given as £2,522,808 in 1949, against £2,649,784 in 1948.

The cost of construction and repair work was £172,113 for work on buildings and plant and £356,087 for work on street mains and services. The corresponding figures for the previous year were £160,362 and £283,387.

An analysis of the cost of materials used shows a total of £1,503,742 in 1949, and £1,625,611 in 1948. These amounts include 245,399 tons of coal, valued at £1,187,033 in 1949 and 245,749 tons valued at £1,337,963 in 1948.

Salaries and wages amounted to £722,958 in 1949 and £705,889 in 1948, and the net output, after all deductions, is valued at £247,282 for 1949 and £264,764 for 1948.

The average number of wage earners in 1949 was 1,646, and in 1948 was 1,593.

The Many Visitors to the South Eastern Gas Board's stand at the South Norwood Exhibition saw an attractive display with many novel features, one of which was Mr. Therm indicating the advantages of gas appliances by means of a flickering wand. Lightning sketches by Mr. O. J. Gamm, Publicity Assistant to the Kent Suburban Division, in which subjects suggested by the audience were illustrated and linked with gas by a suitable caption also proved very popular. Upwards of 150 sketches were produced and presented to members of the audience.

Third Prize in a window dressing competition organised early this year by the Regent Street Association was awarded to the Hurseal Heat display, designed and carried out by students of the City of Canterbury College of Art. The winners themselves are now to award a total of £125 in cash prizes for the most original window or showroom display publicising Hurseal Heat. Display material will be available free of charge and the display will be judged by a committee consisting of the Managing Director of Display Craft, Ltd., the Vice-Chairman of the Winter Thomas Co., Ltd., and the Managing Director of Hurseal, Ltd. Entry forms can be obtained from 229-231, Regent Street, London, W.1.

Combustion Testing

British Standard 717: 1936, 'Combustion Testing of Domestic Gas Appliances,' has been replaced by B.S. 717: 1950, 'Combustion Testing of Domestic Gas Appliances Burning Town Gas,' recently published by the British Standards Institution. The completeness of combustion of town gas is assessed on the basis of the ratio of the volume concentration of carbon monoxide in the products of combustion to that of carbon dioxide—*i.e.*, the CO/CO_2 ratio. The revised British Standard specifies a permissible limit of the CO/CO_2 ratio and lays down methods of measuring it. The limit is such as to give complete safety from undesirable accumulation of carbon monoxide in conditions of proper ventilation.

Since there is a possibility that appliances, particularly portable appliances, might be used in conditions for which they are not intended, a method of assessing their behaviour under conditions of inadequate ventilation is given in an appendix to the specification. The tests described are primarily bench tests for new samples of domestic gas appliances, but they may, when suitable, be applied to other classes of appliance (e.g., catering or industrial) or to appliances that require to be tested as installed, either *in situ* or by simulation in the laboratory of the conditions of installation.

Liverpool Lighting

Maintenance work that accumulated during the war years is still engaging the attention of the Liverpool City Lighting Engineer, Mr. C. C. Smith, who has reported to his committee that while a great deal had been done in this connection a great deal remained.

Work on all new housing estates was abreast of development, and there had been an improvement on the main roads, some of which had remained unlighted since the war. Substantial improvement had also been made in side street lighting.

In the case of electric lamps, of which there were some 17,719 before the war, almost all had been relighted, and in addition 1,859 new positions had been commissioned, including 629 this year, making a total at the end of last year of 18,351 lighted. With regard to gas the position was still difficult. This installation suffered more than did the electric installations, and repairs and maintenance were a more difficult problem. Consequently only 9,132 out of 15,181 in commission before the war were actually lighted.

The total mileage of streets lighted during the year was 765 compared with 953 before the war. Restoration could only be carried out as funds became available. During the year 88,190 glass sides for gas lamps had had to be replaced on account of malicious damage and the cost was about £4,000.

Welding Technique

The British Welding Research Association has published in its technique and memoranda series *Recommendations for the Standardisation of the Radiographic Examination of Welded Joints in Mild Steel Pressure Vessels* (price 1s. 6d.), reprinted from *Welding Research*, Vol. 1 No. 3.

These recommendations were prepared by the FE.6 Committee of the British Welding Research Association on 'Radiography of Welded Pressure Vessels.' The committee has not attempted to prepare a manual of instruction in radiography for the novice, but to provide a direct practical lead towards a uniformly high standard of radiographic procedure in British industry.

The fact which emerges from the committee's deliberations is that the interpretation of radiographs is the proper function of a person trained in radiography, and further that such training as would be required cannot be obtained without considerable practical experience in all aspects of weld radiography.

Indeed, it appears to be quite wrong to attempt to saddle the untrained engineer or inspector with the responsibility of interpreting radiographs. His province is to assess the significance of the defects pointed out to him by the person trained in radiography and on this authoritative information to decide whether he can accept the weld or whether, and in what manner, he requires it to be repaired.

The recommendations cover plant, protection of personnel, radiographers, radiographic technique, numbering of radiographs and a code for interpretation of radiographs.

LONG SERVICE

Elliott Brothers (London), Ltd., who this year celebrate their 150th anniversary, are compiling an authentic record of their activities and would like to hear of the whereabouts of Elliott instruments made during the 19th century.

The firm, founded by William Elliott in 1800, originally made drawing and surveying instruments and acquired the business of Watkins and Hill about the middle of the last century. The available catalogues show that their products included many types of optical apparatus as well as early electrical apparatus which was supplied to the early experimenters. The company developed a calculating machine known as the arithmometer and, towards the end of the century, supplied a wide range of electrical indicating and recording instruments and telegraphic apparatus.

Many specimens of this old apparatus and interesting photographs were destroyed during the war and the company would welcome any information about their early products. Correspondence should be addressed to Mr. A. H. Attwood, Elliott Brothers (London), Ltd., Century Works, Lewisham, S.E.13.

Still a Direct Approach

In a recent talk to the Rhyl Rotary Club, Mr. O. P. Cronshaw, Chairman of the Rhyl Group Committee, Wales Gas Board, said that as a result of nationalisation he now had full control of the Rhyl and Prestatyn gasworks and occupied a position similar to that of a chairman of a board of directors of the St. Asaph and Denbigh undertakings. He was also a member of various specialised committees meeting at Cardiff two or three times a month, and member of a committee which had been set up to further the development of gas supplies in North Wales. He had expected much more red tape than he had actually found. There was still a direct approach to the people who ran the gas industry, and the machine worked even more quickly now than when the undertaking was managed by the local authority.

In an industry whose units ranged from one-man undertakings to those employing many thousands there was bound to be wide variation in costs; for instance, at a small works near Rhyl the labour cost was 11d. per therm, whereas in a medium-sized undertaking it was not more than 3d. per therm. One of the chief aims of the Wales Gas Board was to provide urban amenities for rural dwellers. A large new £850,000 works now being built at Wrexham would in two or three years' time be supplying gas made from local coal to surrounding towns and villages as far apart as Llangollen, Connahs Quay, Holywell, and Flint.

Of all the nationalised industries gas was the only one which had been brought under the control of one administrative unit for the whole of Wales. While the group committees functioned very much like boards of directors—in fact he signed his own salary cheque—the structure was such that specialised officers were available to deal with matters beyond the scope of the group committees and a very efficient accountancy system had been developed.

Gas for G.A.T.T.

The Torquay Sub-Division of the South Western Gas Board actively co-operated in many ways with the local authority in preparation for the United Nations Organisation International Conference at Torquay. Delegates of 40 nations assembled to discuss the General Agreement on Tariffs and Trade in advance of the International Trade Organisation as a basic objective of the Havana Charter.

Two modern gas fires were fitted in the conference room, and a number of hotels were equipped with additional catering and other appliances.

By arrangement between the Sub-Divisional Manager and the Torquay Corporation Entertainments Committee, the overseas delegates inspected the Hollacombe manufacturing station of the Torquay Sub-Division.

In keeping with other business premises in the town an attractive window display was arranged for the main showrooms at Torquay, and was designed by the Divisional Publicity Department. The central feature at the base of the display was a cut-out replica of the United Nations Organisation emblem with the word 'Welcome' shown in the three official languages of the conference, i.e., English, French, and Spanish. In addition, the national flag of each nation was painted on a plaque with the name of the nation above and the word 'Welcome' in the appropriate language below.

Gas Baking Exhibit

After a lapse of many years, the South Wales Federation of Master Bakers' Associations held their Bakers and Confectioners Exhibition at Cardiff.

The Wales Gas Board staged an attractive display which indicated the high standard of cleanliness that can be achieved in the bakehouse with the use of up to date equipment.

Practical baking demonstrations were carried out daily by Hovis, Ltd., and Procea products, Ltd., on a gas-fired Handyman oven.

The range of equipment exhibited included a prover, fondant heater, doughnut fryer (Welsh Enterprises Ltd.), Ellerstyle Thermspray steam boiler, and a Mains muffin plate and deep fryer.

To cater for the hot water requirements of the bakery, a Mains M.15 water heater; Potterton hot water storage set; Ideal hot water boiler and Ascot water heater were on view. Completing the exhibits was a Bratt Colbran luminous panel heater and a Radiant Heating 'Locost' heater to cover the space heating requirements.

Attractive display panels of installations within the area of the Wales Gas Board indicated the developments which are taking place with regard to the baking load. The exhibit was arranged by the Industrial Gas Centre of the Wales Gas Board, from whom we understand that it was an outstanding success.

By a happy coincidence the Federation's *Yearbook* has just been issued. This publication contains a wealth of information for the baker, and among the many articles is 'Gas in the Industry' by Mr. W. H. Tarn, Industrial Gas Engineer, Wales Gas Board.

Have We a National Fuel Policy?*

By W. L. BOON, O.B.E., M.I.Mech.E., F.Inst.F.

THE title of my address is not provocative because the answer to the question it poses is so clearly in the negative. We have no national fuel policy which, in any sense, aims at co-ordinating the effective utilisation of our heat and power resources for the benefit of the community as a whole.

It is remarkable, on the other hand, how persistently eminent industrialists and fuel technologists have pressed this matter over many years. For example, Sir Arthur Duckham addressed the World Power Conference in 1928 on 'A Fuel Policy.' On the same theme, we had Lord Hirst's presidential address to the Institute of Fuel in 1931, Sir Philip Dawson's address in 1937, and, more recently, the two presidential addresses by one of our most honoured Presidents, the late Sir David Milne-Watson. I have been re-reading the addresses he gave to our Club in 1941 and 1942, and I have once again been arrested by the penetration of his vision. Indeed his forecast of the post-war situation was amazingly shrewd, and many of his remarks are as relevant today as they were when they were made.

As you may possibly remember, his 1941 address was devoted to advocating the establishment of a Ministry of Fuel, and by his second year of office the Ministry of Fuel and Power had actually been formed. Sir David, of course, was not alone in pressing for such a Ministry, but it is certain that his views were of considerable influence in securing its formation.

Fulfilment Reached

Although Sir David's suggestion of a Ministry of Fuel reached fulfilment, I am not quite so sure how far the benefits he envisaged have been realised. Fundamentally, he conceived the function of the Ministry to be that of formulating and co-ordinating a national fuel policy so as to secure the most effective and economical use of our fuel resources. He considered this to be necessary because after the war we should be poor and would need to make the most of our coal if we were to recover our economic position.

That forecast has been abundantly justified. The days of cheap and plentiful fuel are over, and with industrial coal in the region of £3 per ton it is vital to practice the most rigid fuel economy if we are to compete in the world markets. We are further impelled to this course by the fact that coal production is now a bottleneck, and the extravagant use of this fuel might easily hamper industrial output. Increasing concern is also being displayed about our coal reserves. Britain's industrial position rests on coal, and although estimates differ it is becoming clear that our reserves are by no means inexhaustible, and that in some directions they are gravely limited.

There is a divergence of viewpoint here that I do not think has yet been sufficiently clearly defined. To the mining engineer one of the invaluable indices to the well-being of his industry is the coal production figure; the higher the output the better he is pleased—and from his standpoint rightly so, because it means reduced operating costs, better return on capital, a larger gross income, and an export trade. But to the fuel technologist coal is a wasting asset which must be used as sparingly as our necessities allow.

I should like to ask what we are doing to ensure that the best use is made of our various heat and power services. Sir David stated the position so clearly that I cannot do better than quote from his 1941 presidential address:

> '. . . having determined the general principles which would govern production, distribution, and utilisation of all fuels in such a way as best to serve the national interest, a single authority, viewing the situation as a whole, could settle the conflicting claims which would undoubtedly be put forward by the various sections of the fuel industry. I have always felt that each fuel has its proper sphere, that each is better adapted than the others for particular purposes, but in the past, owing to the absence of any authority to prevent it, each has sought to impinge upon what has been regarded by the others as their proper sphere. The result has been, in many cases, the use of fuels uneconomically both from the point of view of the user and of the State.'

What evidence is there that we have a national fuel policy on such matters? The Minister of Fuel and Power has been repeatedly pressed to define the national fuel policy, if any, but the only response was from Mr. Gaitskell, who said that fuel policy should be based on the principle of allowing free choice to the consumer. This sounds very laudable, but it really means that the use of our irreplaceable national asset—coal—is to be at the dictate of the consumer's fads and fancies. I am sure that we would all wish to champion the freedom of the individual, but we know that unrestrained liberty to do just as one likes, regardless of the consequences to others, defeats its own ends, and that liberty to waste fuel is a freedom that should be restricted. Mr. Gaitskell's purpose was evidently to retain the element of competition, and this is perfectly sound so long as the competition is healthy, but it is not healthy when the result is 'the use of fuels uneconomically both from the point of view of the user and of the State.'

The results of this policy of having no fuel policy have become only too evident in the load shedding that has been so repeatedly forced upon our electricity generating stations. Their difficulties in respect of plant capacity and supply of fuel must not be under-rated, but, as I see it, the root reason for these power cuts has been that the domestic heating load has got out of control. Under stress of coal shortages, gas strikes, and so forth, people have found it only too easy to buy electric radiators over the counter and plug them in. Millions of radiators must have been sold in these circumstances, and an electrical load that was once regarded as lucrative for its effect in filling up the valleys in the daily load curve, and was enticed by favourable tariffs, has now become the straw that is breaking the camel's back. In consequence, we are perforce shedding industrial load at a time when our national recovery depends on maintaining the highest possible rate of production.

The cost of this lack of policy is not easy to assess, but some guide to its order of magnitude may be obtained by recalling the fuel crisis of 1947, when it was estimated that we lost £200 mill. worth of export trade, quite apart from internal trade, owing to the power cuts. This would be at the rate of something like £40 mill. per week.

Outcome of Laissez-Faire

These losses and inconveniences are the outcome of the *laissez-faire* policy of successive Ministers of Fuel by which the use of any given fuel has been based on its capacity to sell. Had we had a reasoned policy covering the use of fuels on the ground of suitability, this mass sale of electric radiators would not have taken place and load shedding would have been largely avoided.

There have been piecemeal attempts to deal with this problem. During the fuel crisis the sale of electric radiators was restricted; later, attempts were made to regulate the sale by means of purchase tax, and two winters ago the experiment was tried of raising the winter charges for electricity and allowing a rebate during the summer. But all these have been *ad hoc* solutions and have been correspondingly ineffective, and it seems to me that nothing short of an over-riding fuel policy in which the legitimate field of each fuel service—electricity, gas, and solid fuel—is properly defined will provide any real answer to our problem. Can we determine the proper functions of our alternative fuel services in both the industrial and the domestic fields? I suggest that at least some broad principles can be laid down.

In spite of atomic research, our power production will undoubtedly continue for very many years to be based primarily on coal. The development of hydro-electric power, particularly in the North of Scotland, should tend to conserve our coal reserves, and there is a definite field for oil fuel where special considerations apply, such as relative availability of supplies, site restrictions, cleanliness, or instant starting; but these considerations do not affect the main contention that coal is our mainstay. Whatever the source of power, however, electricity unquestionably holds the field as a transmitting agent. Earlier in the century the gas engine enjoyed considerable popularity, supplied either from

* Presidential Address to the Fuel Luncheon Club October 17, 1950.

producers or from a town gas distribution system, but it is now obsolete except for certain specialised applications, and there seems little reason for the gas industry to re-enter the power field.

Another direction in which electricity seems to me to be unrivalled is that of lighting. In spite of gallant efforts on the part of the gas industry, electricity possesses advantages of convenience, flexibility, and effectiveness that cannot be questioned, and I think this a field in which the gas industry should give way to electricity. As you know, I have always had much sympathy with the gas industry, but personally I would carry this policy even to street lighting.

On the other hand I am equally strongly of the opinion that the electricity industry should cease to develop the space-heating and cooking loads, for I believe that these can be carried with much more regard to our national fuel economy by gas and solid fuel. Quite apart from the load-shedding problem to which I referred earlier, by using electricity for heating we are degrading a refined commodity in order to use it for a crude application, and it is this degradation that gives rise to a waste not only of fuel but also of the capital and operating charges involved in generating the electricity thus used. Where the consumer desires the convenience of a space-heating or cooking service on tap, the logical choice seems to me to be gas.

For industrial heating, where a refined, instantly available, and flexible fuel is required, gas seems to be the obvious choice. It can cover an immense range from high-temperature metallurgical

United Kingdom Ga

This table and the one on pp. 338 and 339 are taken from the Mini

Table I.—Summary for gas undertakings vested in area gas boards and railway and transport gas undertakings showing

(1)		Unit	Scottish	Northern	North Western	North Eastern	East Midlands	West Midlands	Wales
		(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Number of undertakings	1948	Number	190	52	103	76	98	71	104
Fuel used for gas making (excluding coke used for heating retorts) :									
Coal...	1948	Th. tons	2,394·2	774·1	3,870·9	1,410·4	1,372·3	2,883·0	452·0
	1949	,,	2,428·5	774·1	3,908·6	1,448·4	1,401·6	2,930·5	490·3
Coke	1948	,,	54·9	48·7	131·1	63·2	59·0	117·8	29·7
	1949	,,	69·3	51·0	140·2	77·7	77·1	128·2	28·7
Coke breeze	1948	,,	—	5·7	2·6	7·2	6·1	0·9	0·1
	1949	,,	—	3·7	1·6	4·7	3·9	0·6	0·1
Gas oil	1948	,,	16·9	14·5	40·6	23·9	22·5	47·1	7·2
	1949	,,	19·3	23·0	48·7	30·7	31·2	54·2	6·2
Gas available :									
Gas made :									
Coal gas	1948	Mn. cu. ft.	38,559	10,925	60,607	21,730	20,655	47,152	6,588
	1949	,,	39,341	11,080	62,879	22,165	21,463	48,470	7,252
Water gas	1948	,,	3,072	2,585	7,172	3,830	3,493	7,323	1,576
	1949	,,	3,883	3,215	8,237	4,804	4,767	7,964	1,435
Other gas	1948	,,	1,271	506	901	102	410	8,698	168
	1949	,,	1,016	684	142	86	448	8,079	116
Total	1948	,,	42,902	14,016	68,680	25,662	24,558	63,173	8,332
	1949	,,	44,240	14,979	71,258	27,055	26,678	64,513	8,803
Gas bought from coke ovens and other outside sources	1948	,,	3,779	14,590	1,619	4,465	24,012	3,553	6,920
	1949	,,	3,651	15,097	1,816	3,726	24,056	3,715	7,480
Total gas available	1948	,,	46,681	28,606	70,299	30,127	48,570	66,726	15,252
	1949	,,	47,891	30,076	73,074	30,781	50,734	68,228	16,283
Coke made for sale	1948	Th. tons	777·5	266·4	1,493·6	571·2	495·1	888·1	146·4
	1949	,,	786·2	269·4	1,467·0	532·0	472·2	993·2	174·8
Coke breeze made for sale	1948	,,	166·8	14·0	221·1	71·4	57·6	235·6	11·5
	1949	,,	150·1	12·6	199·0	64·3	51·8	212·0	10·3
Gas sold :									
Domestic	1948	Mn. cu. ft.	31,304	15,463	39,480	16,072	22,015	27,564	8,531
Industrial	,,	,,	5,590	6,757	13,870	6,220	17,614	28,927	2,527
Commercial	,,	,,	4,474	3,041	7,599	3,244	3,313	4,023	1,820
Public administration	,,	,,	667	623	1,770	697	1,266	942	307
Public lighting	,,	,,	1,096	527	1,704	947	712	865	206
Total	,,	,,	43,131	26,411	64,423	27,180	44,920	62,321	13,391
	,,	Th. therms	188,378	126,543	294,390	128,679	216,604	260,507	61,153
Number of consumers...	1948	Thousands	1,177	633	1,687	821	1,022	993	404

processes to infra-red drying, and is amenable to the most accurate control.

In alignment with gas, solid fuel stands as the proper alternative where price and availability are important factors. It stands to particular advantage where the loading is continuous, such as in winter space heating, hot-water supply, and cooking for large establishments, whereas gas is at a premium for intermittent usage where its instant availability is an asset. In fact, in the domestic world a happy marriage between gas and solid fuel is a certain guarantee of thermal bliss.

In applying such principles as I have suggested we must, of course, permit some degree of flexibility, for there will be numerous occasions when special circumstances will point to a choice that would not normally be considered sound. Nevertheless, I would commend to you in broad principle the need for a clearly defined national fuel policy which will determine the use of our various fuel services on the basis of relative suitability and effect on our national economy. I have suggested in outline that power and lighting should be the prerogative of electricity and that gas and solid fuel should go hand in hand to meet our needs for industrial heating, domestic space heating, and cooking. Such a policy would still leave much scope for individual discretion and for a healthy degree of competition, but it would eliminate that wasteful kind of competition arising from an attempt by one service to encroach on a domain more legitimately served by another. It is essential, I think, to look beyond immediate commercial returns to the wider issue of the effect of our actions on the fuel resources of the nation.

Gas Statistics

Ministry of Fuel and Power Statistical Digest, 1948 and 1949.

showing number of undertakings, fuel used, coke and coke breeze made for sale, gas sold, and number of consumers.

Eastern (10)	North Thames (11)	South Eastern (12)	Southern (13)	South Western (14)	Total (15)	Railway and transport undertakings (16)	Grand Total (17)		(1)
90	12	61	57	123	1,037	8	1,045	1948	Number of undertakings
									Fuel used for gas making (excluding coke used for heating retorts) :
1,393·5	4,001·3	3,239·8	1,193·9	1,393·6	24,379·0	65·7	24,444·7	1948	Coal
1,446·5	4,244·8	3,354·2	1,249·5	1,382·0	25,059·0	67·3	25,126·3	1949	
99·3	329·0	170·0	116·4	91·9	1,311·0	3·4	1,314·4	1948	Coke
90·5	310·5	155·0	103·6	89·8	1,321·6	3·2	1,324·8	1949	
0·3	—	2·0	15·0	1·8	41·7	—	41·7	1948	Coke breeze
0·2	—	1·3	9·7	1·1	26·9	0·2	27·1	1949	
30·6	120·5	69·7	36·4	30·6	460·5	1·5	462·0	1948	Gas oil
30·4	98·4	63·5	31·5	31·9	469·0	1·5	470·5	1949	
									Gas available :
									Gas made :
20,030	53,022	41,762	16,858	19,815	357,703	1,008	358,711	1948	Coal gas
20,808	55,993	43,690	17,879	19,507	370,527	1,033	371,560	1949	
5,667	18,574	9,987	6,696	4,772	74,747	201	74,948	1948	Water gas
5,469	17,489	9,231	5,961	4,891	77,346	198	77,544	1949	
594	311	810	133	867	14,771	—	14,771	1948	Other gas
496	186	364	40	1,054	12,711	1	12,712	1949	
26,291	71,907	52,559	23,687	25,454	447,221	1,209	448,430	1948	Total
26,773	73,668	53,285	23,880	25,452	460,584	1,232	461,816	1949	
									Gas bought from coke ovens and other outside sources
11	735	9	—	—	59,693	—	59,693	1948	
—	700	9	—	—	60,250	—	60,250	1949	
26,302	72,642	52,568	23,687	25,454	506,914	1,209	508,123	1948	Total gas available
26,773	74,368	53,294	23,880	25,452	520,834	1,232	522,066	1949	
512·4	1,580·5	1,229·7	394·1	529·9	8,884·9	25·1	8,910·0	1948	Coke made for sale
526·6	1,737·1	1,375·1	437·6	519·1	9,290·3	17·9	9,308·2	1949	
46·4	191·2	202·3	38·7	56·1	1,312·7	4·3	1,317·0	1948	Coke breeze made for sale
41·8	172·1	182·1	34·8	50·5	1,181·4	2·0	1,183·4	1949	
									Gas sold :
16,627	42,033	35,202	15,912	17,643	287,846	379	288,225	1948	Domestic
4,010	10,505	4,872	1,532	1,877	104,301	745	105,046	,,	Industrial
2,467	10,361	6,249	3,208	2,783	52,582	31	52,613	,,	Commercial
380	1,852	1,064	887	638	11,093	5	11,098	,,	Public administration
262	713	687	220	215	8,154	1	8,155	,,	Public lighting
23,746	65,464	48,074	21,759	23,156	463,976	1,161	465,137	,,	Total
113,157	329,487	244,307	102,183	106,754	2,172,142	5,398	2,177,540	,,	
647	1,749	1,427	525	600	11,685	18	11,703	1948	Number of consumers

Table II.—Summary for gas undertakings vested in area gas boards and railway and transport gas undertaking

(1)	Unit (2)	Scottish (3)	Northern (4)	North Western (5)	North Eastern (6)	East Midlands (7)	West Midlands (8)	Wales (9)
Average number of operatives employed during year	Number	8,543	4,552	13,266	6,243	7,476	9,376	3,286
Persons employed in September, 1948 :								
Operatives :								
Works and plant	,,	4,136	2,235	6,714	3,221	3,390	5,251	1,531
Distribution	,,	4,443	2,373	6,623	3,031	4,163	4,188	1,782
Administrative, technical, clerical, etc.	,,	1,747	1,102	2,929	1,289	1,819	2,340	824
Total	,,	10,326	5,710	16,266	7,541	9,372	11,779	4,137
Wages and salaries :								
Operatives :								
Total paid during year	£ thousand	2,566	1,371	4,230	1,934	2,361	3,102	1,007
Administrative, technical, clerical, etc. :								
Total paid during year	,,	626	407	1,154	520	642	934	321
Capital expenditure on new assets :								
Capital cost of new buildings (including extensions and replacements), excluding site values	£ thousand	50	4	333	89	144	97	20
Plant and machinery (excluding second-hand items)	,,	930	460	2,492	717	1,038	1,466	334
Mains and services	,,	600	346	790	343	667	697	387
Appliances for hire	,,	117	67	141	47	45	229	26
Vehicles (excluding second-hand items)	,,	17	18	48	21	21	38	8
Total	,,	1,714	895	3,804	1,217	1,915	2,527	775
Cost of purchased materials and fuel used :								
Coke, coke breeze and other by-products purchased	£ thousand	75	254	88	50	45	76	37
Other purchased materials and fuel used :								
Coal	,,	6,641	1,998	11,165	3,724	3,856	8,408	1,350
Other fuel (excluding gas purchased from other gas undertakings)	,,	440	883	683	543	1,439	833	641
Materials	,,	949	683	2,289	1,082	1,489	2,124	443
Total	,,	8,105	3,818	14,225	5,399	6,829	11,441	2,471
Value of output :								
Gas sold to consumers	£ thousand	8,927	4,431	14,145	5,850	8,178	11,098	3,222
Coke and coke breeze (a)	,,	2,570	1,171	5,426	2,043	1,740	3,527	549
Other by-products (a) and electricity	,,	1,129	447	1,842	587	640	1,378	123
Meter and other rents receivable	,,	277	457	569	266	464	525	223
Net proceeds from re-sale of appliances	,,	179	116	522	215	169	265	108
Net receipts for work charged for	,,	250	301	683	404	487	752	217
Value of other work done on new construction	,,	603	275	1,110	356	469	541	232
,, ,, ,, *repair and maintenance*	,,	*1,075*	*533*	*1,623*	*813*	*1,058*	*1,270*	*366*
Total (excluding repair and maintenance work)	,,	13,935	7,198	24,297	9,721	12,147	18,086	4,674
Net output (value of output *less* cost of purchased materials and fuel used) :	£ thousand	5,830	3,380	10,072	4,322	5,318	6,645	2,203

The First British Instrument Industries Exhibition takes place at Olympia from July 4 to 14, 1951. It is supported by the British Electrical & Allied Manufacturers' Association; British Industrial Measuring & Control Apparatus Manufacturers' Association; British Lampblown Scientific Glassware Manufacturers' Association; Drawing Office Material Manufacturers' & Dealers' Association; and Scientific Instrument Manufacturers' Association of Great Britain. The purpose is to show scientific and industrial instruments of entirely British manufacture and, with the export market in mind, supporting Associations and the Organisers, F. W. Bridges & Sons, Ltd., are approaching potential overseas buyers through all appropriate channels.

A Previous Decision that the latest houses on their housing estate should be all-electric and that no gas points should be provided was reversed at the last meeting of Market Rasen U.D.C. after hearing a statement by Mr. R. H. Holland, manager of the local gas undertaking. Mr. Holland gave comparative costs and argued that, service for service, gas prices compared very favourably with those for electricity. Coun. G. R. Spencer said he would much prefer to be without electricity than without gas. Coun. Houlton said he would like to see gas points made available to tenants and then leave it to them to decide for themselves. A proposal that two gas points should be provided in each new house at a cost to the Council of £5 10s. was carried.

The Third Annual Report of the International Association for the Exchange of Students for Technical Experience contains details of the progress made during the past year. Perhaps the most important development of the year is not so much the numerical increase of the exchange—though that is of gratifying proportions—as the geographical development which has taken place. America and Germany have become members, and other countries, both in and outside Europe, are actively considering membership. In this country the expansion of the central organisation has continued by the inclusion of students from six additional universities and colleges. The total number of universities and colleges taking part is now 19.

owing employment, wages and salaries, capital expenditure, purchased materials and fuel used, and value of output.

Eastern (10)	North Thames (11)	South Eastern (12)	Southern (13)	South Western (14)	Total (15)	Railway and transport undertakings (16)	Grand Total (17)	(1)
6,282	17,762	15,566	5,849	6,434	104,635	239	104,874	Average number of operatives employed during year
								Persons employed in September, 1948 :
3,168	9,735	8,292	2,921	3,215	53,809	165	53,974	Operatives : Works and plant
3,173	8,192	7,349	2,950	3,195	51,462	72	51,534	Distribution
2,275	6,030	5,161	1,672	1,673	28,861	27	28,888	Administrative, technical, clerical, etc.
8,616	23,957	20,802	7,543	8,083	134,132	264	134,396	Total
								Wages and salaries :
1,993	6,420	5,357	1,799	1,914	34,054	90	34,144	Operatives : Total paid during year
845	2,898	2,191	621	639	11,798	12	11,810	Administrative, technical, clerical, etc. : Total paid during year
								Capital expenditure on new assets :
162	185	46	59	86	1,275	o	1,275	Capital cost of new buildings (including extensions and replacements), excluding site values
1,370	2,708	2,312	890	694	15,411	20	15,431	Plant and machinery (excluding second-hand items)
331	815	511	291	416	6,194	15	6,209	Mains and services
69	265	198	7	167	1,378	o	1,378	Appliances for hire
29	292	74	34	24	624	o	624	Vehicles (excluding second-hand items)
1,961	4,265	3,141	1,281	1,387	24,882	35	24,917	Total
								Cost of purchased materials and fuel used :
126	287	998	22	51	2,109	o	2,109	Coke, coke breeze and other by-products purchased
4,712	12,164	9,941	4,064	4,660	72,683	202	72,885	Other purchased materials and fuel used : Coal
427	1,351	855	454	458	9,007	18	9,025	Other fuel (excluding gas purchased from other gas undertakings)
980	1,829	2,337	781	843	15,829	29	15,858	Materials
6,245	15,631	14,131	5,321	6,012	99,628	249	99,877	Total
								Value of output :
6,790	19,134	16,197	6,022	6,451	110,445	270	110,715	Gas sold to consumers
2,033	6,267	5,386	1,579	2,022	34,313	88	34,401	Coke and coke breeze (a)
750	2,604	2,578	459	607	13,144	23	13,167	Other by-products (a) and electricity
670	2,097	1,497	440	467	7,952	3	7,955	Meter and other rents receivable
394	456	463	153	46	3,086	2	3,088	Net proceeds from re-sale of appliances
414	1,089	1,083	315	563	6,558	5	6,563	Net receipts for work charged for
370	530	507	130	438	5,561	1	5,562	Value of other work done on new construction
761	*3,117*	*2,729*	*899*	*998*	*15,242*	*19*	*15,261*	" " " *repair and maintenance*
11,421	32,177	27,711	9,098	10,594	181,059	392	181,451	Total (excluding repair and maintenance work)
5,176	16,546	13,580	3,777	4,582	81,431	143	81,574	Net output (value of output *less* cost of purchased materials and fuel used) :

(a) Adjustments have been made for changes in stocks.

The Eastern Junior Gas Association visited the works at Edmonton of Thomas Glover and Co., Ltd., on November 18, when they had the opportunity of seeing how meters are made and of appreciating the accurate and delicate operations involved. The visit was marked by informality, and the fact that there were no 'set speeches' enhanced rather than detracted from the usefulness and enjoyment of the occasion. Thanks to the firm for their hospitality were voiced by the President of the Association, Mr. G. Davies.

Harrogate Women's Gas Development Association recently held a successful whist drive in the Demonstration Hall of the Harrogate undertaking, attended by 80 members and friends. The prizes, which were donated, were distributed by Mrs. Atkinson. A vote of thanks was moved by the President, Mrs. Allum, to the ladies on the entertainment committee for their work in connection with this effort.

Durham County Council has decided not to take any action in support of Stockton Town Council's opposition to the Northern Gas Board's plan for a gasholder at Portrack, Stockton. The town council is urging the Ministries of Fuel and Power and Town and Country Planning to receive a deputation as soon as possible on the subject. The new holder, the council complains, is to be built adjoining a school.

A New Gasholder with a capacity of a million cu.ft. is proposed for Gainsborough at an estimated cost of £99,600.

Consultative Committees.—Eight consumer committees have now been formed in the area for which the Northern Gas Consultative Council is responsible. Only two remain to be formed, at Newcastle and Stockton, and arrangements are under way for these to begin functioning in the near future. Because there is still a large proportion of the public unaware of the machinery which exists for the ventilating of their complaints, Alderman Joseph Hoy, Chairman of the council, has issued an appeal for greater use to be made of the committees.

The Sales and Service Angle

ONE of the sessions at the recent highly successful staff conference of the North Eastern Gas Board held at Scarborough was devoted to presentation and discussion of four papers on the sales and service angle. Mr. A. McDonald (member of the board) was in the chair and Mr. Norman Hudson, Chief Commercial Officer to the board, heralded the programme with a general statement in which he referred to the board's position under the Gas Act, 1948, the importance of the load factor, and the problem of tariffs. The first paper given was by Mr. D. C. Henderson, Assistant Commercial Officer, whose comments were confined to domestic sales. His paper was published substantially in the *Journal* of October 4.

Installation Plus Service

Following the paper by Mr. Henderson, Mr. **R. Howarth,** Installations Engineer to the board, spoke about equipment, installation, and service. He said:

Every new appliance in which we are interested is given a thorough laboratory test to see if it conforms to the required British Standard Specification for that type of appliance. These tests are carried out for us by the Watson House Laboratory of the North Thames Gas Board. After having received a report, we invariably subject the appliance to a district field test, to ascertain that the appliance will function correctly under practical conditions. After these two tests we are satisfied—if the reports are satisfactory—that the appliance can be recommended to the group general managers as being suitable for purchasing, provided they have a demand for that particular type.

I do not wish to give the impression that we consider the above tests will solve the problems of excessive complaints. The laboratory test and field test are only one section of this vast problem. One of the chief causes of dissatisfaction among our consumers is variation in gas pressure, and, closely allied, variation in the constituents of the gas itself. These failings are causing us grave concern. There are consumers in some districts having to contend with pressures varying from 2 to 8 in. We cannot expect an appliance to give constant results under such conditions.

Meters are an expensive item in the yearly purchases of all groups, and the attention that has to be given to meter defects is costly. We are continually investigating new developments in gas registration, to see if these costs can be reduced. Field tests are in progress on several types of die-cast meters, to see if they offer a solution to some of our difficulties. Regarding meter defects, there are thousands of meters fitted under sinks and draining boards, with the result that they have to be continually changed, due to the cases being badly corroded. I am aware that these positions were decided upon 30-50 years ago, and would not be allowed today, but even so, I know of several large housing estates, totalling hundreds of houses, which were erected just prior to the last war, where the meters are fitted on a shelf in the middle of the kitchen wall with the gas cooker and boiler situated directly underneath. We must insist that the meter is fitted in a dry and airy position, and situated where a minimum of live service is inside the consumers' premises.

For the internal carcassing of new property in our area, copper tubing is generally used, and I am convinced that if it is properly installed it gives a sound and satisfactory job. Certain precautions have, however, to be taken to ensure that the tubing has a long life. For example, copper tube should not be buried in breeze block walls unless sufficient space is allowed round the tube for a sand-cement mortar to be grouted round the pipe. Again copper pipe should not be allowed to be in direct contact with unwashed sea-sand.

The types of tubing used for existing property are iron, copper, and lead, and at the present time we are not too concerned about this variation.

We should inaugurate periodical maintenance calls at all consumers' premises. I have had experience of such a scheme prior to the war, and the average number of appliances sold per man averaged 200 per annum, apart from the sale of spares and fittings, etc. Until we reintroduce such a scheme we have to content ourselves by giving attention to complaints and defects upon request. This service must be prompt and efficient.

Realising the importance of good and efficient service as a means of sales promotion, we are trying our utmost to improve this by ensuring that appliances are satisfactory before being offered for sale, and we also are arranging lectures to fitters within the area by manufacturers' technical representatives, to instruct them in the erection and maintenance of their respective appliances. I should like to see in the near future a centre where all fitters could be given a periodical refresher course which would enable them to be kept up-to-date with all the latest developments in appliances and fittings.

Industrial Research and Service

Then came a paper on 'Industrial Research and service' by Mr. **A. G. Higgs,** Industrial Engineer to the board, who explained that the board had set up in the Industrial Department a Research and Development Section. Although the building for this section was only acquired some six months ago, alterations to the accommodation and the installation of plant and machinery are virtually completed. Work has commenced on a small scale initially, on a programme of investigation of methods of gas application affording a competitive thermal efficiency with other fuels, in certain industries offering good potential.

Mr. Higgs went on to say that one of the first processes selected for investigation was that of malt and barley drying in the malting industry. 'Installations,' he said, exist in two districts of the board's area where gas is used for this type of work, and an idea of the potential can be gained from the fact that the gas consumption at one firm alone has been as high as 130 mill. cu.ft. per annum. There are many such maltsters scattered throughout the board's area and if, as we anticipate, the gas consumption per quarter of grain dried can be reduced—and we hope to reduce it by as much as 30%—then with the present price of anthracite our position would be most competitive and the potential in the other districts could be fully exploited.

'A further project, which is part of a programme of research designed to extend the use of gas in the glass industry, is the question of heating revolving fore-hearths attached to glass tank furnaces. Technically this appears at first sight to be a very difficult problem to solve in that the design giving increased efficiency must not be capable of being used with fuel oil. Certain methods of firing offer possibilities of achieving this objective and these are being explored. Although in the main such plant is confined to works in two groups, the potential load is considerable and has the advantage of having an ideal load factor.

'Other fuel consuming industries which will receive attention in due course include the woollen industry, the shoddy industry, the brick industry, the chemical industry, and the cement, soap and confectionery industries.

'Where the potential justifies the procedure, as it does in the instances cited, the board is prepared to finance not only the investigations conducted on its own premises, but the installation of a prototype plant on the consumer's premises. Such projects are, of course, long-term investigations; the routine work of dealing with the special problems submitted by group industrial engineers receive immediate attention.

'One frequent demand today is for concentrated combustion burners in a variety of shapes to fit in with the modern tendency towards continuous line production. Several such burners to suit the requirements of consumers in the glass and engineering industries have been produced.'

Mr. Higgs commented on another problem, not directly concerned with the development of potential load—the question of increasing the safety of utilisation in existing plant. The question of ensuring safe ignition of multiple

burners. This, he explained, is a matter that has engaged the attention of the Industrial Gas Development Committee and its Safety Devices Sub-Committee for a considerable time. In liaison with this committee they were trying out a design of ladder pilot which appeared relatively immune from blockage on laboratory tests and which, if correctly fitted, should ensure safe ignition of such burner arrangements. When coupled with a flame failure device and correctly operated and tested at specific intervals, such an arrangement would appear to provide a large measure of protection against explosion hazards. Several such burners are, at the moment, undergoing field tests on different types of plant to determine how they stand up in practice.

Publicity and Propaganda

The final paper of the session on the Saturday morning was by Mr. **C. L. Maunder,** Publicity and Public Relations Officer to the board, on 'Publicity and Propaganda.' He pointed out that the cost to the consumer of any commodity or service is governed just as much by the cost of distribution and selling as by the actual cost of manufacture. 'The more gas we sell per consumer, the cheaper we can provide it. If we don't promote gas sales, if we don't advertise, then the consequent decline in consumption will mean an increase in the cost of supply. Even in nationalised industries sales promotional publicity is not only permissible but is in fact a fundamental need.'

There was also, he continued, one other aspect of gas advertising which might merit consideration as being specially applicable to the particular problem of controlled load development as distinct from indiscriminate load development. One of the unique features of advertising and publicity was its flexibility. It could be used as a spotlight that could be focused at will on one or more specific facets of gas service which might at any time be in need of temporary boosting in order to create a satisfactory load factor. Propaganda was the dissemination of information which allied to the physycological use of 'suggestion' could be employed to breed the germs of an idea, to kindle thought, and thence to create an attitude of mind pre-disposed to react in a certain way.

Long before nationalisation the former British Commercial Gas Association and the British Gas Council conducted a propaganda campaign which had been carried on to this day by the distribution of educational films, publications, exhibitions, Press publicity, and so on. The aim had been to identify the gas industry with the idea of progress and development in housing (and also in the industrial fuel services), to present the industry as a progressive and public spirited organisation vitally concerned in improving living conditions by fostering keener interest in, and providing fuel service properly planned to improve the amenities of, the home.

He thought the Gas Council and its predecessors had done a good job of work, but that this work had been inadequately supported. And he went on to explain that the North Eastern Gas Board had set aside a fixed sum of money for the first year's advertising and the budget had been planned to make use of all useful and available media. They were advertising consistently in more than 50 newspapers in the board's area. They were advertising on hoardings, public vehicles, and on cinema screens in the principal towns, and this programme would be gradually stepped up to achieve complete coverage. They were participating in all major exhibitions, and groups were being encouraged to take part in local exhibitions and shows at their own discretion. They at headquarters were aiming to provide every possible assistance in the design and planning of exhibition stands and showroom and window displays.

They had made available two film projectors and were prepared to augment this number as and when the demand for their film service was such as to warrant the purchase of another projector. Through the Gas Council they had supplied technical and sales promotional literature to meet every known need; all that remained was for the groups to make full use of the services available. Educational films would accomplish nothing if they were not shown to the right people. The most persuasive advertising literature could not possibly achieve its objective if it was resting in the showroom manager's office. Every effort must be made, therefore, to explore all possible avenues of distribution of such advertising material.

The board had determined on a sales plan for the coming months, concentrating in turn on the various loads—cooking, water heating, home laundry, space heating, refrigeration. Therefore, their short term advertising campaigns would be linked up with the corresponding sales effort, and would be conducted at area level from headquarters.

The Gas Council's own publicity section was performing a valuable service, but, to take just one case in point, there was a need for more and better films—in fact, there was need for intensified propaganda by all methods.

At area board level there was need for more dominant publicity in the Press on the hoardings, and in the cinemas. At group level there was need for closer co-operation with area headquarters and better use of services provided. Full use, Mr. Maunder concluded, was not being made of advertising literature available from the Gas Council.

Meter Rentals. — Stockton-on-Tees Chamber of Trade has decided to make a strong protest against the imposition of quarterly meter rentals on non-domestic consumers by the Northern Gas Board. At a meeting of the chamber a member suggested that traders could retaliate by charging the Board rent for the space occupied by gas meters. Blyth (Northumberland) Chamber of Trade has also received complaints from commercial gas users about meter rents.

Chemical Works Safety

Almost 250 higher technical and administrative representatives of the chemical industry met at Scarborough on September 29—October 1, for the third Chemical Works Safety Conference organised by Royal Society for the Prevention of Accidents for the Association of British Chemical Manufacturers. Visitors from overseas included Dr. S. Balke, of the Berufsgenossenschaft der Chemischen Industrie, Munich; M. A. Nicaise, of the Union Chimique Belge, Brussels; Dr. H. A. J. Pieters of the Staatsmynen in Limberg, Heerlen; and M. A. L. Vallaud, of the Institut National de Securité, Paris.

In his opening address, Professor G. M. Newitt, President of the Institution of Chemical Engineers, suggested that as visits by parties of students to chemical works had proved useful in giving them an insight into industrial methods and equipment, similar visits should be arranged for the sole purpose of studying safety measures.

The opening address was followed by a paper by Mr. J. Eyers, Vulcan Boiler & General Insurance Co., Ltd., on 'Safety in the Services Department.' On September 30, three papers were presented, 'Fire Hazards and Precautions in the Petroleum Industry,' by E. E. Chanter, Shell Refining and Marketing Co., Ltd.; 'Fire Hazards and Precautions in the Manufacture and use of Solvents,' by J. Howlett, Distillers Co., Ltd.; and 'Investigation of the Causes of a Fire,' by Dr. J. B. Firth, North-Western Forensic Science Laboratory.

A two-way brains trust was a feature of the conference. The question master was Mr. H. R. Payne (Imperial Chemical Industries, Ltd., Chairman of the A.B.C.M. Works Safety Committee); and his team: Dr. A. J. Amor (Imperial Chemical Industries, Ltd.); Mr. I. E. Baggs (Imperial Smelting Corporation, Ltd.); Mr. G. Brearley (Brotherton & Co., Ltd.); and Mr. A. G. Palmer (Institution of Gas Engineers), who deputised at short notice for Mr. K. W. Rattenbury who was unable to attend.

Two papers were given on the new B.S. Code No. 1500 for Fusion Welded Pressure Vessels. The first, from the manufacturers' point of view, was by W. E. Chipperfield, of Babcock and Wilcox, Ltd., and was presented, in the author's absence by T. B. Webb, of the same company. The second, by J. W. Strawson, of the Shell Refining and Marketing Co., Ltd., dealt with these vessels from the users' standpoint.

The conference closed with a tribute by H. M. Chief Inspector of Factories, Mr. G. P. Barnett, to the technical quality of the various papers and to the value of such conferences in promoting the interest of higher managements in safe working.

The autumn number of *Carron Cupola* gives an interesting description by F. McEwan (Departmental Manager) of the cooking apparatus department at the works of the Carron Company. The article lists 31 items required to complete the up-to-date kitchen, and concludes: 'Of the cooking apparatus department it can truly be said that of all the troubles that may descend on it, boredom will not be one of them.'

Water Gas Plant at Glasshoughton

THE Yorkshire Junior Gas Association and the Manchester District Junior Association of Gas Engineers joined forces on November 8 on a visit to Glasshoughton (West Yorkshire Grid), where they inspected the installation of automatic carburetted water gas plants recently completed for the North Eastern Gas Board by Tully, Sons & Co., Ltd., Newark. Their visit also included the Rothwell governor station.

A large attendance of members took part in this interesting visit, and after a luncheon at the Griffin Hotel, Leeds, they proceeded to the North Eastern Gas Board's headquarters in Bridge Street, to hear a paper read by Mr. L. W. Roberts, General Manager, West Yorkshire Grid, on 'Ten Years' Maintenance of the Grid'—see pages 360-366.

The Glasshoughton Plant

The installation at Glasshoughton comprises three automatic carburetted water gas plants. These plants were converted from existing blue water gas plants which were originally erected at Sheffield as a wartime measure. The United Kingdom Gas Corporation placed an order with Tully, Sons & Co., Ltd., to add carburettors, superheaters, waste heat boilers, and to re-design the whole of the mechanical operating gear. The plants, along with relief holder, purifiers, exhausters, and compressors, were erected on the National Coal Board's chemical and coking site, Glasshoughton, nr. Castleford. The whole installation thus comprises a completely self-contained gas-making plant and was intended for feeding into the U.K.s West Yorkshire Grid system. After nationalisation the plant came under the jurisdiction of the North Eastern Gas Board The following is a brief description of the new plant.

The carburettor is 8 ft. 6 in. diameter × 21 ft. 6 in. high and the superheater 8 ft. 6 in. diameter × 25 ft. high, and they are lined with high quality Scottish refractory insulated from the shell with a Kieselguhr - asbestos compound. Checker bricks of special type are included in the design.

The waste heat boilers are of the horizontal multitubular type and along with the jacket boilers of the generators produce the whole of the steam for the plant so that the units are completely self-supporting. The boilers raise 40 lb. of steam per 1,000 cu.ft. of gas made at an average pressure of 130 lb./sq. in. Automatically controlled surplus valves are provided for feeding excess steam to the coke ovens steam mains.

Secondary and tertiary blast valves have been supplied. These are designed with an automatic isolating butterfly valve, and an automatic purge valve is incorporated in the valve body. During the gas-making period the butterfly valve is closed and the purge valve opened. This permits the blast main and the body of the blast valve to be purged. The secondary air valve admits air at the top of the carburettor and the tertiary air valve admits air at the top of the superheater for burning the residual carbon monoxide from the blow gases. The amount of secondary and tertiary air is controlled by butterfly valves which are operated from the main control panel.

Stack valves have been provided on the waste heat boiler outlet and on the superheater outlet (the latter to be used if the boiler is isolated). These valves are of the rolling carriage type.

Separate up and down run wash-boxes are provided and contain under-water mechanically operated valves.

Seal boxes are provided on the gas outlet main of each unit.

Automatic Operator

All the operating valves of the plant are connected to a mechanically controlled operating gear in such manner that each and every valve opens and closes in correct sequence and to the required cycle. The operating machine is of the positive acting type and complete with its motive power consisting of a 440 V, 3 phase, 50 cycle, 2 H.P. electric motor.

The operating machine is constructed so that the valve operating sequence can in no way be changed, but the relative duration of each phase of the cycle of operation is readily adjusted. Moreover, in the event of any valve failing to operate, the machine is prevented from progressing the cycle by the inclusion of a suitable trip mechanism on the prime mover.

The operator is arranged so that any failure of the blower during the gas-making period automatically stops the operator just before the blow, or any failure during the blow stops the operator at the end of the blow.

The operating machine is set to operate the valves on the plant in the following sequence:—

	Blast Valves	Up-run Valves	Down-run Valves	Stack Valve	Steam Valves
Blow	Open	Shut	Shut	Open	Shut
Purge	Shut	Shut	Shut	Open	Open
Up-run with oil	Shut	Open	Shut	Shut	Open
Up-run no oil	Shut	Open	Shut	Shut	Open
Down-run	Shut	Shut	Open	Shut	Open
Up-run	Shut	Open	Shut	Shut	Open

Provision is made to operate the whole of the gear by hand.

The gauges, meters, and plant controls are mounted on a control panel and include steam and oil pressure gauges, air flow meters, oil meters and plant pressure gauges. Also included are electrically driven phase indicators which indicate the phase of the plant cycle as well as the relative positions of the other two plants.

A control wheel is provided for opening and closing the plant process steam, and this automatically starts or shuts down the mechanical operator. Hand wheels are also provided for operating the secondary tertiary air butterfly control valves.

During luncheon Mr. **D. M. Thompson,** President, Manchester Juniors, moved a vote of thanks, on behalf of the two Associations, to the North Eastern Gas Board. Mr. Thompson said they had all enjoyed the interesting visit to the two stations on the Yorkshire Grid. The co-operation had been excellent, and it gave him very great pleasure to propose a vote of thanks to the Board, and particularly to the Secretary, Mr. Gardner, Mr. Roberts, General Manager of the Grid, and to Mr. Currier, Deputy Chairman of the North Eastern Gas Board, who had kindly arranged for the visit.

Mr. **E. R. Hartley** (Hoyland) seconded the vote.

Responding, Mr. **G. E. Currier** tendered apologies from Dr. Edwards, Chairman of the Board, who was unable to be with them. Mr. Currier went on to welcome many friends from Lancashire. He referred to what he termed the rather depressing reports of the Board of Examiners of the Institution of Gas Engineers. The juniors, said Mr. Currier, had a tremendous part to play in raising the educational standard of their members. There was a serious shortage of teachers and instructors, and he appealed to members to give this matter their serious consideration. In getting the two Associations together for their joint visit they had brought together representatives of three area boards—North Western, East Midlands, and the North Eastern.

Gas for Peterlee

In our issue of September 27 (page 576) we referred to the arrangements being made by the Northern Gas Board for the supply of gas to the new town of Peterlee. Further information on the development of this scheme was given by Councillor M. Purcell (Chairman of the Easington R.D.C.) at a recent meeting of the Horden Parish Council. He said that the effect of the link-up would be that the Horden, Blackhall, and Easington areas would have gas for the first time.

The installation of the 12 in. main from West Hartlepool was advancing rapidly, and the introduction of gas to the area would be the greatest social advantage which South-East Durham had known. The introduction of gas to their mining villages was not only belated—it was 50 years overdue. As long ago as 1936 Easington Council made representations to Hartlepool Gas and Water Company for a gas supply, but the war intervened. The Peterlee Development Corporation had, however, decided upon gas for its houses and as a result neighbouring villages would also benefit. The board first required a concensus of opinion from the people in the various types of houses—Council, N.C.B., and privately-owned—because there was an installation fee for each dwelling house of £3 5s. The council was agreeable to the installation so far as their 6,200 houses were concerned.

IN PARLIAMENT

The Coal Situation

THE day before the publication of the National Coal Board's long-term plan for reorganisation and re-equipment of British coal mines (discussed in our issue today) the Minister of Fuel and Power, Mr. Noel-Baker, replying to questions in the House of Commons, stated that the tonnage of United Kingdom coal available for export would be substantially less than a year ago. 'We need more coal than we are getting,' he said, 'not only for export but also for the domestic consumer and for other needs at home. The Government will make the essential requirements of the home market the first charge on our resources. We shall certainly have some coal for export, although as a result of the present levels of home consumption and output the tonnage will be substantially less than it was a year ago.'

An Export Sacrifice ?

Asked by Mr. Geoffrey Lloyd (C., Kings Norton) if his answer meant that owing to inadequate production by the coal industry the Government was having to sacrifice the export trade as well as foreign exchange requirements to home consumption, the Minister said that internal consumption had increased so greatly under full employment that some exports were having to be postponed.

Mr. Noel-Baker said that distributive stocks of coal on October 28 were 15.4 mill. tons to which must be added about 400,000 tons distributed to domestic consumers under the summer prices scheme.

In answer to further questions Mr. Noel-Baker said it was of urgent importance that the present decline in manpower in the mines should be checked and that the number of miners should, if possible, also be increased. The National Coal Board had this year recruited more newcomers to the industry than they did a year ago. But, in conditions of full employment, more men had also left the mines for other work, and since July some thousands of miners had joined the Armed Forces of the Crown. The Coal Board and the Government viewed with particular concern the fall in the manpower at the face. They were now urgently considering what steps could be taken to check the present wastage, to induce more ex-miners to return to the pits, and to improve general recruitment. He was also asking the National Union of Mineworkers to consider how we could most effectively bring home to every miner the nation's urgent need for more coal during the coming winter months.

Foreign Labour

Mr. Colegate (C., Burton) asked whether the Minister had considered recruiting foreign labour, which could be done on terms which would protect the home workers and secure, at any rate for a period of years, labour which would be only too glad to come and help.

Mr. Noel-Baker replied that this was now under consideration by the National Coal Board and the National Union of Mineworkers.

The following day (November 14), in the House of Lords, Lord Teynham called attention to the detrimental effect of opencast coalmining on agriculture. He said that the real reason for spoiling the countryside was that the National Coal Board had failed to produce enough deep-mine coal to maintain our exports, and added that if absenteeism in the pits could be reduced we could do away with opencast mining. The Minister had apparently ridden roughshod over organisations in Worcestershire. He had perpetrated an outrage on rural England.

For the Government, Lord Hall said he could see no expectation that opencast mining could be discontinued before the end of the current programme, and that was to produce 45 mill. tons during the years 1950 to 1953. It was hoped and expected that production would then tail off rapidly during the next two years and it probably would not be economic to produce opencast beyond 1955. The number of men under 20 years now in deep coal mining, he continued, was only about one-third of that in 1938. Of costs he said: 'This year the loss is about 3d. a ton. We are hoping for the future it will pay its way.' The case for opencast was unanswerable because it was an essential part of our economy. About 58,000 acres had been requisitioned to date of which 53,000 were farmland. Sixteen thousand acres had already been restored for farming, and they were studying new methods of restoration. In regard to farmland in Worcestershire, it was not likely that more than 100 acres would have to be dug up, and no working proposals would be put in hand until all interests had had an opportunity of giving their views. He concluded: 'We would welcome the day when opencast could be discontinued. But that day is not yet.'

A Key Industry

Mr. Tom Williamson, J.P., General Secretary of the National Union of General and Municipal Workers, said that he was deeply impressed by what he saw when he visited the North Western Gas Board's headquarters in Manchester recently.

'I have been greatly impressed by the plans now well under way in the North-West for co-ordinating production and distribution,' he stated. 'I have also been impressed by the obvious drive and enthusiasm that permeates the Board's organisation.'

Mr. Williamson said that it could not be stressed too often that if the living standards are to be safeguarded let alone improved there must be a sustained co-operative effort by management, technical and supervisory staffs, and workers towards maximum efficiency. The gas industry's efficiency would not only reflect itself in better service and lower prices to consumers and improved conditions for those employed in the industry but would make a contribution to lower costs of production in industry generally.

Thanking Colonel Carr for the invitation to visit the Board, Mr. Williamson assured him of the good wishes of his many friends on the Trades Union side of the industry and expressed the hope that his health would soon be restored and his great knowledge and experience of the gas industry would be available in some capacity of a less strenuous nature.

Accompanying Mr. Williamson as guests of the Board were Mr. Harold Hough, Lancashire District Organiser, and Messrs. J. Perkins, R. Francis, E. Jones, J. Aherne, W. Wilson and S. Brown, officials of the National Union of General and Municipal Workers.

Board members present included Colonel W. Moncrieff Carr, C.B.E., T.D., Mr. A. Henshall, Mr. H. Butters, Councillor C. E. P. Stott, J.P., and Mr. D. P. Welman, the new Chairman.

STEPS by the North Western Gas Board's Salesmen's Circle to decentralise its structure with a view to broadening its activities were described by Mr. A. Henshall, Deputy Chairman of the Board and President of the Circle, at a meeting of the Circle held at the Victory Works of Parkinson & Cowan (Gas Meters), Ltd., at Stretford, on November 1. Seven Circle Groups are to be formed, and meetings are to be held monthly. Membership, said Mr. Henshall, was intended to cover not only salesmen but home service advisers, coke salesmen, and all employees whose normal daily duty brings them into contact with the consumer, such as meter inspectors, meter readers, and fitters.

Our photograph, taken on the occasion, shows (left to right): Mr. C. H. Leach, Group General Manager, Liverpool, Mr. C. H. Pearson, General Manager, Parkinson & Cowan (Gas Meters), Ltd., and Mr. Henshall.

Alleged Unfair Competition in Somerset

Tenants Denied Freedom of Choice

A RESOLUTION was passed at a meeting of the South Western Gas Consultative Council at Taunton on November 1 'deploring the action of the South Western Electricity Board in formulating charges for installation to housing estates which prevent local authorities from allowing the tenants freedom of choice between gas and electricity.' The resolution also deplored an attempt 'to use their monopoly in lighting to enforce the use of electricity for other purposes, in some cases against the wishes of the tenants.' Copies were sent to the South Western Electricity and Gas Boards.

The discussion arose when the Chairman (Mr. A. W. Loveys) stated that the Somerset County Council were developing a housing estate for their staff at Comeytrowe, near Taunton, and the Consultative Council asked them to give tenants freedom of choice between gas and electricity.

Alderman A. C. Mole (chairman of the County Council Estates Committee) said that ultimately 80 houses would be built, but so far the Ministry had sanctioned only 22. He said the South Western Electricity Board made it clear that if the houses were to be connected for lighting only they would expect a capital contribution of approximately £2,100; if electric cookers were installed the contribution would be £500 and if the houses were all-electric the board would waive any charges in respect of the provision of electric mains and services. Because the heavy capital charges mentioned would have fallen on the scheme if gas and electricity had been installed, resulting in an excess of the approved estimated cost, the County Council accepted tenders for the complete electric installation.

With regard to the dual supply, said Mr. Mole, the Minister had limited the amount to be spent on the estate and in any case they could not afford to pay £2,000 for a cable in order to have the privilege of putting in gas. They had to act at once and the result was that they went ahead with the electric undertaking to reduce the cost. If a local authority was willing to make a capital contribution it could have both gas and electricity.

Grave Concern

Mr. L. P. Ingram (Deputy General Manager) said the principle of this matter was causing grave concern not only to the gas board but to local authorities generally. Most authorities had given freedom of choice to tenants as between gas and electricity, but the case quoted by Alderman Mole was not an isolated one. The gas board had made a standard charge to housing authorities of £5 per house as a contribution towards mains, services, and internal piping; they had taken the rough with the smooth. But the electricity authority had the whip hand and they knew it, said Mr. Ingram. Electricity was essential in the modern home. They knew very well they were going to get the lighting and had framed their quotations accordingly. They were prepared to sink £50 capital in each house to get an electric cooker and wash boiler. It was not economic and immediately ruled out gas.

The electricity board was using a monopoly to get a load it could not carry. Every morning on the wireless housewives are being asked not to use electricity between certain hours. There was also shedding of the industrial load and re-armament and export business generally were being hindered.

Mr. Mole said the Minister of Fuel & Power was not willing to intervene with area gas or electricity boards on this question, which was considered to be a matter of administration and well within the competence of the industry concerned. If, however, a local authority was aggrieved in any case, it could raise the matter with the appropriate consultative council.

Mr. H. G. Damerell said the gas industry had never feared real, sensible competition. It was presumptuous of the electricity authority to mislead consumers and sell appliances when they might possibly not be able to stand up to the responsibility of giving the service.

Mr. F. G. Underhill (Chagford) suggested that the gas and electricity boards, or their consultative councils, should have a joint meeting to come to an amicable settlement. If two nationalised industries could not agree in the interests of consumers, it showed the fiasco of the whole legislation.

Further Integration

The Chairman, in his report, said the gas board proposed to link the main production centres of Bristol, Bath and Weston-super-Mare. This would make possible subsidiary linkings and the extension of trunk mains to gas production centres of limited or insufficient output. A further long term plan was to link Cheltenham, Gloucester, and Bristol. In the meantime, Ross, Mitcheldean, Drybrook ,and Cinderford would be connected by mains now being laid. Similarly a main is being laid from Downend to Chipping Sodbury to carry a supply from Bristol.

Further south it was intended to link Wellington with Taunton and a high pressure main between Exeter and Exmouth had recently been completed. Plans had been made for Colyton to be provided with gas from Seaton via Colyford and for Tiverton to be supplied from Exeter. In the Torquay district it was proposed to link up Kingsbridge with Salcombe, Teignmouth with Dawlish, and Newton Abbot with Chudleigh. A network of high pressure mains was being developed in the Plymouth Sub-Division which would couple up the smaller works, and some measure of integration had already been achieved in Cornwall.

The major producing plants were being extended to meet the increased demands. Additions to the Torquay and Gloucester works had come into operation allowing a much higher output of gas. Further extensions at both those places and also at Bristol and Bath had been planned.

He was not yet able to report that the board had formulated revised industrial tariffs or proposals regarding differentials. The necessary preliminary investigations were proceeding as fast as circumstances allowed. The issues involved were complex and it would be difficult to find solutions that would satisfy every gas consumer.

Gas Company's Mortgage

In the Chancery Division on October 5 and 6 the Pearl Assurance Company, Ltd., sought a ruling as to whether a debt of £18,480 secured by a document dated December 19, 1938, issued by the Cannock District Gas Company to the plaintiffs and called a 'redeemable mortgage debenture' constituted a liability or obligation of the gas company and became vested in and enforceable against the West Midlands Gas Board, or whether the document constituted a security in respect of which the plaintiffs were entitled to and bound to accept compensation under the Gas Act, 1948.

Mr. J. B. Lindon, K.C., for the Pearl Assurance Company, said the document in question was called a redeemable mortgage debenture and it would have been difficult to argue that it was not a debenture or a mortgage, but the difficulty was that only certain mortgages quoted in the Stock Exchange Daily List on certain dates were to be included. If the document was a mortgage and was not quoted on one of those dates it was plainly not included.

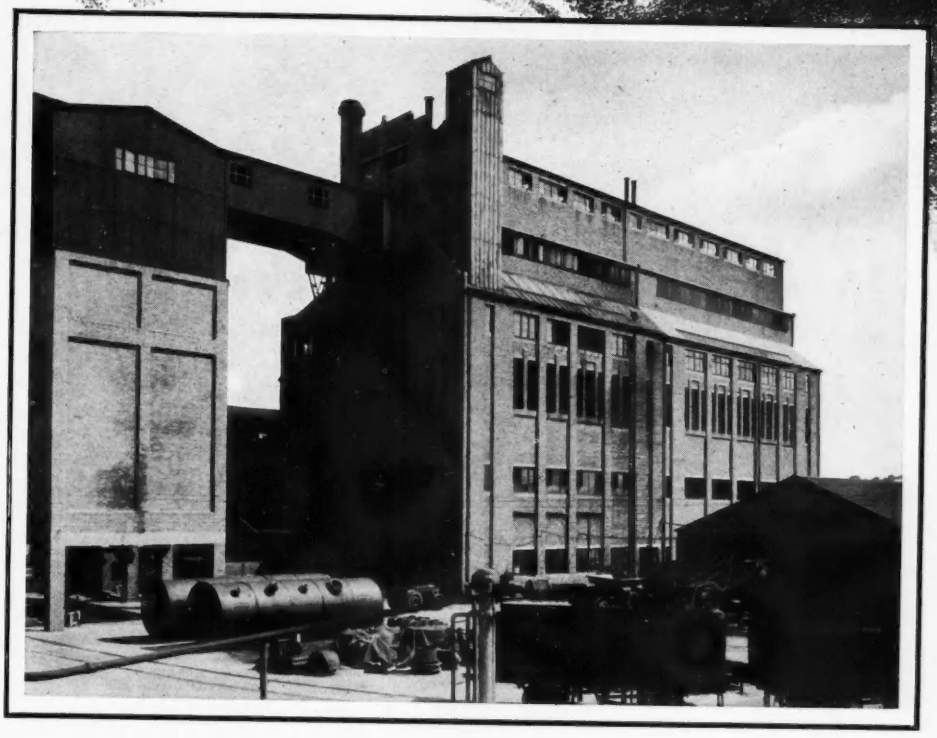
He submitted that 'shares, stock, debentures and debenture stock' meant such securities as were not mortgages. Debentures and debenture stock were plain debts with no charge. Debenture stock was not necessarily a secured debt.

Mr. G. Upjohn, K.C., for the West Midlands Gas Board, contended that the plaintiffs as the holders of securities issued by the company were entitled to compensation under the Act.

Mr. Justice Wynn-Parry said plaintiffs had argued that the document did not fall within the definition because the words 'debenture and debenture stock' were confined to debentures and debenture stock which did not create a charge upon the property of the company.

Such a construction would defeat the policy of the Act which was that the area board or Gas Council in whom the undertaking was vested should assume its liabilities and obligations, and that securities were not to be kept alive but extinguished, the holders receiving in exchange British Gas stock.

There would be a declaration that the redeemable mortgage debenture in question was a security in respect of which plaintiffs were bound to accept compensation under the Gas Act.



The Continuous Vertical Retort House at the Gloucester Undertaking of the South-Western Gas Board enclosing the first installation of 12–82″ Lambent Heated Retorts (1943) and, in the extension beyond, the new Installation of 16–82″ Lambent Heated Retorts.

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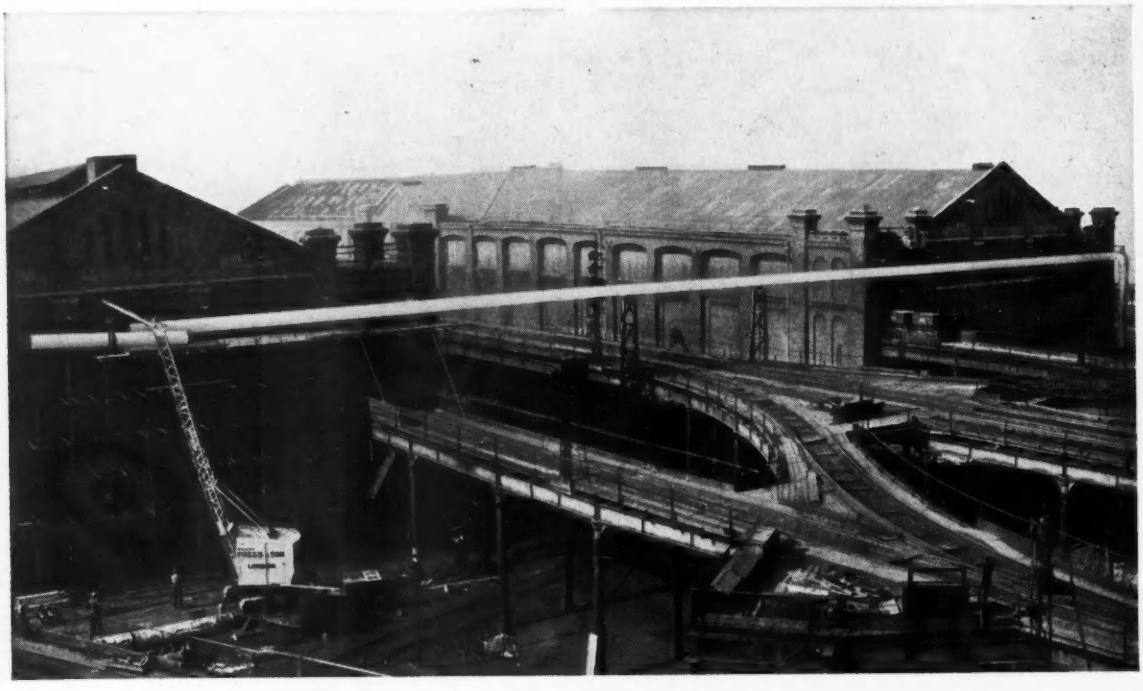

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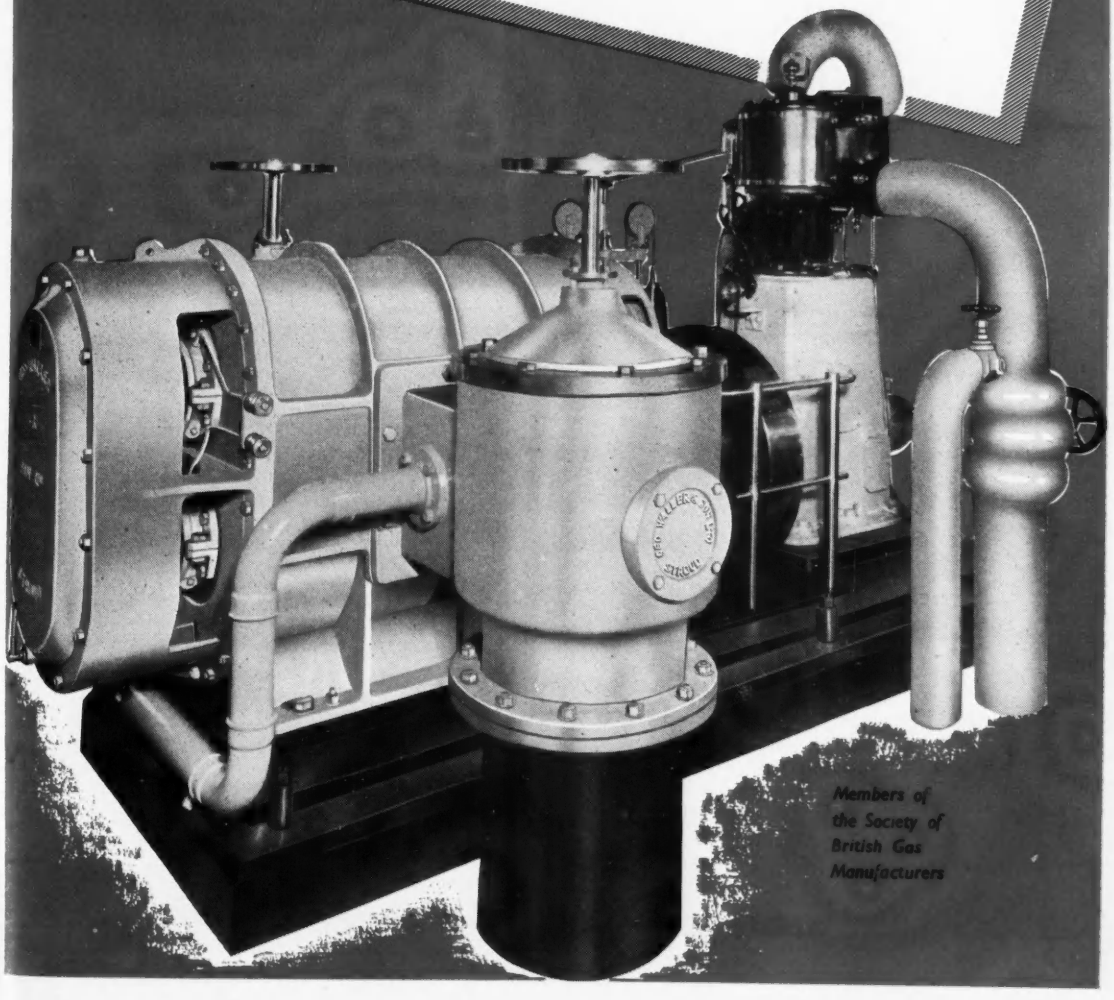

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The Public Works and Municipal Services Congress and Exhibition

PUBLIC works and private lives were blended at Olympia last week when 1,400 representatives of 721 local authorities attended a conference to discuss ways and means of extending municipal services and thus improving the lot of Mr. and Mrs. Joe Public. The subjects were for the most part technical, but the aim throughout was service to the man in the street, his safety and comfort on the roads, his right to and use of smallholdings, his immunity from infection, and his entertainment. Complementary to this conference was a large exhibition in which 250 exhibitors sought to show how modern engineering science could be harnessed to assist the humble ratepayer.

The whole event, an amalgamation of the former Public Works, Roads and Transport Congress and Exhibition and the Public Health Congress and Exhibition, boasted the still fussy title of the Public Works and Municipal Services Congress and Exhibition. It was well attended, well organised, and, in the view of most of the participants and visitors, well worth while.

Five Government departments and 13 engineering institutions were included in the Organising Committee, among them our own Institution of Gas Engineers. The latter sponsored one session, when the chairman was Mr. F. M. Birks, C.B.E., President of the Institution. The paper presented on this occasion was 'Modern Methods and Technique of Main Laying,' by W. H. G. Roach, M.B.E. This was in no way similar to the paper Mr. Roach presented to the Midland Junior Gas Association in March of this year, which was concerned with the technique—if such a word may be used—of dealing with contractors. Admittedly, this important aspect received mention, but the paper as a whole was extremely general in scope and the author clearly aimed at presenting a broad picture of the subject such as would suit the requirements of a largely non-specialised audience. The essentials of mainlaying were put in the proverbial nutshell, and it is fair to suggest that the paper will long serve as a valuable guide to those municipal officers concerned with the subject.

Future Building Practice

This was not the only paper likely to interest gas engineers and distribution staffs. John L. Beckett's paper on 'Public Services in Relation to Town and Country Planning gave a concise description of the motives underlying town planning today, and reference was made to the desirability of building new gas works or extending existing ones. The author also commented on the necessary co-ordination of public utilities laying services underground, etc.

Distribution engineers may also be interested in 'The Engineer and House Construction,' by J. B. Wikeley, a paper which deals with a technique of house building with foamed slag cast *in situ*. The author's experience is based on the construction of 126 houses at Grassmoor in the Chesterfield rural district. These houses, as illustrated in the paper, are astonishingly ugly, but they may well illustrate a form of house building likely to become increasingly widespread, and which, owing to the peculiar constructional methods employed, may present the gas industry with some special problems.

Lastly, mention must be made of 'The Backgrounds of Street Lighting,' by E. J. Stewart, which although it avoided entirely the respective merits of gas and electricity, had much of interest to impart concerning road surfaces, curves, roundabouts, footway materials, and similar factors. As the title suggests, the paper was mainly concerned with backgrounds, the author maintaining that the background of every object in the street must be considered if lighting is to give maximum assistance to both driver and pedestrian.

Gas Council Exhibit

With the Grand Hall with annexe and half the gallery, and the National Hall with the whole of its gallery occupied, this was an exhibition of considerable size. Its theme was peculiarly suitable for a display by the gas industry, which has so much to offer as a service to the community. The Gas Council seized the opportunity with both hands and produced a stand which, if not the best creation to come from Gas Industry House, was certainly of a high standard and well suited to the requirements of the exhibition. It was bright and colourful, and was divided into three main sections. The first of these dealt with the use of gas in schools, not merely for heating but for school catering. Thus examples of gas-fired large-scale catering appliances were included, notably a Stott sterilising sink, a Radiation 'Grosvenor' range, a Main steamer, and a Hawkins steriliser. The school lab was not forgotten, and apparatus ranging from the humble bunsen burner to a 'G.L.C.' muffle furnace was included in this part of the exhibit. Hot water supplies and clothes drying were also featured, and large groups of appliances suitable for space heating and domestic science teaching completed this section. Cookers, water heaters, washing machines, refrigerators, coke boilers, etc., composed the section devoted to domestic appliances, in the form of a smokeless fuels kitchen.

Diverse Subjects

The third and more general section comprised such diverse exhibits as greenhouse heating, street lighting, road tar surfaces, and so on. Transport was represented by an Incandescent Heat Co., Ltd., tool hardening furnace and a Hancock profiling machine.

One of the more interesting of the appliances shown was the 'Dryatherm' industrial clothes dryer (Radiant Heating Co., Ltd.), which was fitted with hooks for 24 hats and coats and could be installed for the drying of clothes in cloakrooms on wet days. The dryer operated like a miniature central heating system, burning only 6-7 cu.ft. of gas an hour. For such public servants as postmen, road men, and others who have to be on duty in all weathers, this dryer constitutes a major step towards comfort and health.

A general view of the Gas Council stand, showing in the foreground the section dealing with gas-fired appliances for use in schools.

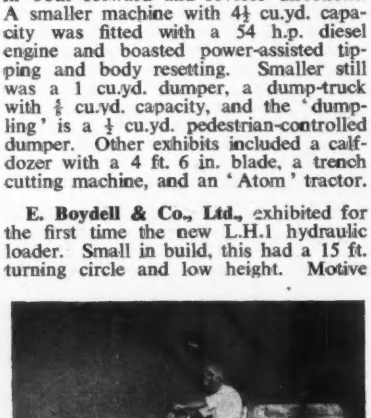
The following review has been compiled as an indication of the numerous exhibits of interest to the gas industry and of the several new products to be seen.

A.C.E. Machinery, Ltd., well known to the gas industry for their screening unit, exhibited several other types of hoisting gear. There were two platform hoists, one a 15 cwt. capacity tower mast hoist, and the other a 12 cwt. capacity petrol or diesel driven hoist. Two types of winches were also shown. One, a 35 cwt. diesel-driven machine, had a foot-operated auxiliary Servo type band brake and over-mounted lever. The other, a 5-10 cwt. petrol-driven winch on a pneumatic tyred portability set, could be used as a separate unit or in conjunction with tower mast platform equipment; the wheels were quickly detachable for safe storage. The last exhibit on the stand was an electrically-driven capstan with foot button control; these machines are available in 1-5 ton capacities.

The **Automatic Telephone & Electric Co., Ltd.,** and their associate, Communication Systems, Ltd., presented a range of products which had direct applications in many public and municipal services. Among them was the 'Rythmatic' ripple control equipment which utilises the electricity supply network as a signalling medium for the centralised control of remote switches, and Electro-matic traffic control for single intersections or complex junctions. Other exhibits included a private automatic exchange, press button intercommunication systems, and sound amplification and distribution equipment.

Aveling-Barford, Ltd., exhibited several dumpers, in addition to a variety of road rollers. The largest of these dumpers was the 'S.C.' heavy duty model with a capacity of 9 cu.yd. Fitted with a 135 b.h.p. Diesel engine and patent two-way steering, the hydraulically-operated gear box gave four speeds in both forward and reverse directions. A smaller machine with 4½ cu.yd. capacity was fitted with a 54 h.p. diesel engine and boasted power-assisted tipping and body resetting. Smaller still was a 1 cu.yd. dumper, a dump-truck with ¼ cu.yd. capacity, and the 'dumpling' is a ½ cu.yd. pedestrian-controlled dumper. Other exhibits included a calf-dozer with a 4 ft. 6 in. blade, a trench cutting machine, and an 'Atom' tractor.

E. Boydell & Co., Ltd., exhibited for the first time the new L.H.1 hydraulic loader. Small in build, this had a 15 ft. turning circle and low height. Motive power was provided with a hard duty petrol engine developing 35 b.h.p.; diesel power was optional. It was claimed that speeds up to 12 miles per hour are obtainable, while loading in excess of 20 tons per hour and unloading in excess of 25 tons per hour are possible. Steering was by heavy duty box, which incorporated a novel split track rod arrangement for extra locking and slick turns. Transmission was laid out in the familiar unit construction style, utilising a sliding gear type gear box, with two speeds in either direction, a fully flexible prop shaft, worm reduction final drive and fully floating axles. In addition to this new model, three dumpers (the 20 B., 6½ cu.yd., the 14 B., 4½ cu.yd., and the 10 B., 3 cu.yd.) were shown, as well as a 'Muir Hill' loader.



New Boydell L.H.1 hydraulic loader.

W. E. Bray & Co., Ltd., also introduced a new model at this exhibition. This was the Bray 'Hydraloader' with full width 1 cu.yd. capacity bucket, giving full coverage to the front wheels of the tractor. Powered with a Perkins P.6 diesel engine and fitted with various ancillary equipment, this loader was expressly designed for handling coal, coke and other loose materials. The stability of this model was maintained and it possessed the exclusive features of the standard ¾ cu.yd. machine. The latter, also shown, was fitted with a petrol engine. Another interesting exhibit was the Bray 'Angledozer,' fitted to a Fowler 'Challenger' tractor.

Bray Hydraloader with 1 cu.yd. bucket.

The **British Electrical Development Association,** which is more or less the electrical counterpart of the Gas Council, was effectively hidden in a cul-de-sac in the Grand Hall gallery. The stand featured a typical school kitchen for 250 persons, and other exhibits included fluorescent street lighting lanterns, with supporting photographs, etc.

The **British Road Tar Association** had a pleasant, flower-decked stand on which the principal exhibit was a display of spray jets for surface dressing machines, which enabled visitors to inspect the main features of several types of jets. An outline diagram of a modern tank sprayer showed the spray bar and the method of operating the jets. Made-up samples of various forms of tarmacadam were in evidence, and photographs illustrating the texture of the materials as seen on the road could be inspected. The Association's certification trade mark figured largely as the central theme of the general design of the stand, which, as in former years, took the form of an information bureau. Publications issued by the Association were available to surveyors.

Broom & Wade, Ltd., exhibited two new machines. One was the S.V.78 portable sleeve-valve compressor, powered by a 24 b.h.p. 'Standard Motors' petrol engine. The unit delivered 60 cu.ft. of free air per min. at 100 lb. The special design, embodying unit construction and tubular receiver chassis, enabled the weight to be reduced to under 13 cwt. This model was sectioned and driven by a small electric motor. Also new was the R.C.B.10 roller chain hoist powered by an eight-cylinder crankless air motor. This hoist lifts 25 times its own weight and can be handled by one man. It was demonstrated in conjunction with a 'Broomwade' 29 cwt. wire rope hoist. Other exhibits included a range of stationary air compressors, and two types of portable compressor.

The **Chaseside Engineering Co., Ltd.,** presented a smart exhibit which contrasted bright orange machines against a sky blue stand. Although the Chaseside Company makes 14 main types of mobile mechanical shovels, of ½, ¾, and 1 cu.yd. capacity, and one and two ton mobile cranes, a shunting tractor, and also a 3 cu.yd. dumper, only four or five representative machines were shown at the exhibition. The equipment exhibited was powered by petrol or diesel-engines, the latter being in increasing demand owing to the operating cost savings which the well-known economy of this type of engine shows. In addition, the steadily increasing range of appropriate attachments to the Chaseside shovel, such as the recently introduced angle-dozer, were shown, and the whole exhibit was supported by a colour film showing various types of machines engaged on a variety of jobs.

George Cohen & Co., Ltd., exhibited three in the Jones K.L. series of mobile cranes, together with a concrete mixer, and a selection of contractors' tools and equipment. The largest of the cranes was the K.L.44, which was powered by a diesel engine, and had a maximum lifting capacity of four tons. Chassis mountings available included heavy duty pneumatic-tyred wheels with steel restrictor rings, twin solid rubber-tyred wheels, crawler tracks, or rail wheels. A lorry mounting (for speeds up to 20 m.p.h.) could also be supplied. A 25 ft. channel jib was fitted as standard, but alternative 30 ft., 40 ft., or 50 ft. lattice jibs could be supplied; also the swan-neck type. The other models shown were the K.L.22, which had a lifting capacity of two tons, and the K.L.15, with a lifting capacity of 15 cwt., the uses of which range from skip-hoisting on trench work to lifting and positioning constructional units on building sites.

The **Consolidated Pneumatic Tool Co., Ltd.,** exhibited a remarkable range of compressed air plant, including portable compressors in capacities of 63, 105, 160, 210, 315, and 500 cu.ft., and a Class T single stage, water-cooled horizontal type compressor for low pressure operations. Incidentally, the latter, which produces air at 40 lb. pressure, can be converted to high pressure operation. In addition to the compressors, the stand also contained such products as hand and motor feed drifters, sinker drills, clay-diggers, pumps, vibra-

tors, and drill rods with the latest detachable bits and ancillary machines such as drills, grinders, pneumatic hammers, etc.

The **Department of Scientific and Industrial Research** had a magnificent stand, finished in compelling red and yellow, which made the maximum use of timber. The stand embraced displays by the Building Research Station (dealing with reinforced concrete bridges and the prevention of damage to plumbing systems by frost), the National Physical Laboratory (showing X-ray examinations of industrial dusts), the Road Research Laboratory (demonstrating a most interesting mobile laboratory), and the Water Pollution Research Laboratory. This excellent exhibit should do much to publicise further the diverse services offered by the Department.

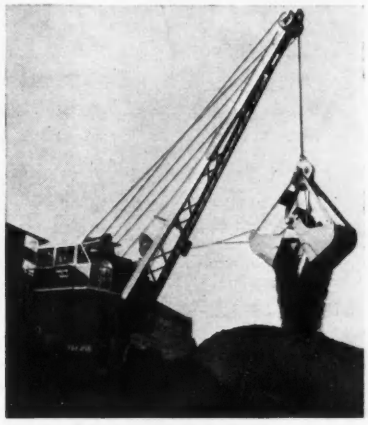
Electrolux, Ltd., on a gallery stand, combined their refrigerators with their suction cleaners in a neat display. The centrepiece was a most horrific housefly (we assume) which carried the caption: 'His food or yours?' The refrigerator featured on the stand was the M.151 built-in type of which, it is claimed, over 100,000 have been supplied for temporary prefabricated houses and local authority permanent housing schemes. The other products on display included the Model 33 commercial and light industrial cleaner, the Model 55 quiet suction cleaner, and the Electrolux floor polisher.

G. A. Harvey & Co. (London), Ltd., offered their extremely wide range of perforated metals for a variety of purposes. This firm is, of course, well known for screening, grading, and filtering materials, particularly for use with vibratory and rotary screens, but these products composed only a small proportion of the exhibits. Other items shown included gilled tubes, sheet metal, ornamental grilles and ventilating panels, tanks and cisterns, calorifiers, ventilators, pipes and gutters, and steel office furniture.

Hilmor, Ltd., exhibited a comprehensive range of tube bending machinery, which included bench fixture and lightweight portable models for the plumber, electrician and gas fitter, hand-operated general purpose benders, and hand-operated mandrel machines for the production of uniformly accurate full bore bends on extra short radii. Of particular interest to the building and allied trades are the hand-operated and motorised 'Rotary' hydraulic benders for heavy gauge gas and steam tube. These, together with other machines, were demonstrated daily, and skilled operators were in attendance on the stand to give any information or assistance required in connection with tube bending.

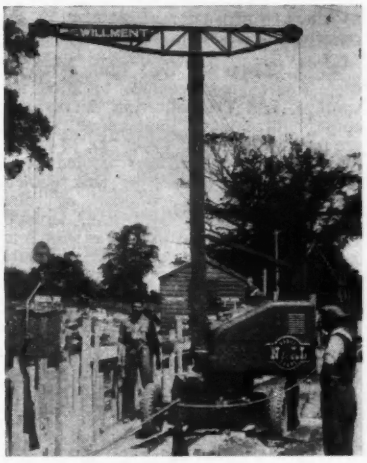
Holman Bros., Ltd., on an attractive pale blue stand exhibited a considerable range of compressors and pneumatic tools. Of the compressors—all of which were of the differential piston, two-stage design, the smallest, the A.T.H.85, with a displacement of 80 cu.ft. per min. at its maximum speed of 1,000 r.p.m., was shown in operation. Large stationary compressors, looking very well in their dark green paint, were also exhibited. Most impressive, however, was the Holman 'Tractair,' a self-contained, self-propelled unit consisting of an air-cooled compressor mounted on a tractor, and available with either petrol, T.V.O. or diesel engine. Other exhibits included air-operated winches having nominal powers of 5, 7½, and 10 b.h.p., pneumatic tools of various types, including the powerful S.S. 22 road ripper, etc.

The **Horstmann Gear Co., Ltd.,** presented a stand of unusual and attractive design, with an unusual type of 'cut-out' façade. The appliances shown were for the automatic control of public lighting, and among them were the well-known 'Newbridge' gas controllers and comets. The use of the latter eliminates the need for constantly burning by-passes and enables considerable economy in gas consumption to be effected. For example, an ordinary by-pass consumes approximately ¼ cu.ft. of gas per hour and many consume as much as 1 cu.ft. of gas per hour. Comets consume 1 cu.ft. of gas per year, and it will be readily appreciated that the savings effected by their use offset the initial installation costs within a short time.



The Jones KL 44 mobile crane by George Cohen & Co., Ltd.

The **International Coin Counting Machine Co., Ltd.,** showed a new type F.4 machine for counting and sorting mixed silver at the rate of £1,200 per hour. It also dealt with mixed copper. The coins were sorted into their different denominations and dropped into pouches of other suitable receptacles After much development, a £5 automatic stop has been fitted, making this machine the only one of its kind in the world. A table model mixed silver counting machine, known as the type G.3, also incorporated this automatic stop. Also shown were types H. and J. single denomination copper, silver, and token counting machines for checking and bagging the money or tokens received from collectors. The machines can be fitted with grand and sub-total counters which enables a record to be kept of the amount received from each individual source, as well as a total of the day's takings. The machines were fitted with automatic mechanism which stopped the machine when the required number of coins or tokens had been counted. Other exhibits included electric and hand-operated letter opening machines and envelope sealing machines.



The type G.M. crane exhibited by R. H. Neal and Co., Ltd.

Lawler, Ayers & Co., Ltd., incorporated on their stand a number of new developments in their existing range of pipe-bending machines. Particular mention might be made of the new 'Universal' small pipe bender specially designed to bend the smaller capacities of copper tube in general use, but which could easily be carried in the average tool kit. Though weighing only 15 lb., this machine was a perfect bender, and incorporated all the accepted features of the firm's 'Tubela' pipe bending machines, including their patented eccentric roller adjustment. The T.5(b) model would bend with ease and accuracy ½ in. and ¾ in. copper tube to B.S.S. 659/44. The company also exhibited and demonstrated the latest model H.1 hydraulic bender for the heavier gauges of gas and steel barrel up to 3 in. diameter. Following the success of their 'Laco' slate and asbestos cutting tool, which was also exhibited, a new 'Laco' tool had been specially designed for cutting all forms of corrugated asbestos from standard corrugations up to 'big six.'

The **Lead Wool Co., Ltd.,** exhibited from their range of two-stage portable air compressors the 'ACD 105' two-breaker machine, which, powered by a diesel engine, and mounted on sprung axles with pneumatic-tyred wheels and brakes, was suitable for high-speed towing. A selection of various pneumatic tools was shown, with full equipment, hose and couplings, etc. Pipe jointing materials for mainlaying were also displayed, the exhibit comprising 'lead wool,' leaded yarn, bitumenised yarn, ordinary spun yarn, and so on. Caulking tools, chisels, and cutting-out tools, and extruded lead wire in various sizes and sections were shown, and there was a display stand of pipe joints, jointed with the firm's materials and cut away to show the solidity and effectiveness of the various joints. The company's well-known main testing appliances were on the stand, and twin and single barrel pumps and representative examples of testing plugs, flanges and spigot end stoppers. The joint testing apparatus for pipes over 30 in. diameter with which tests of individual joints can be carried out quickly, simply and economically, was displayed. Also on view was the range of anti-friction metallic

packings, which offer advantages in the reduction of friction.

R. A. Lister & Co., Ltd., exhibited their smart green engines to good advantage, and the following details give some indication of their range. These are petrol engines: Type 'D,' 1½ h.p., hopper tank or radiator cooled; type 'A,' 3/3½ h.p., hopper or tank cooled; type 'B,' 4/5 h.p., hopper or tank cooled; type G1,' 3½/7 h.p., tank or radiator cooled, also available with integral 2/1 reduction gear or reduction gear and clutch; type 'G2,' 5½/12 h.p., tank or radiator cooled, also available with integral 2/1 reduction gear or reduction gear and clutch. The following are diesel engines, tank or radiator cooled: Type 3/1, 3/3½ h.p.; type 5/1, 5/6 h.p.; type 10/2, 10/12 h.p.; type CD, 5/8 h.p.; type CE, 10/16 h.p.; type 9/1, 9 h.p.; type 18/2, 15/21 h.p.; type 27/3, 23/30 h.p.; type 38/4, 32/40 h.p. Also shown was an auto truck of one ton capacity. This was the NPS/NU9 universal tipping model, with 17 cu.ft. capacity body and with pneumatic-tyred wheels.

Lyte Ladders, Ltd., specialise in the manufacture of a wide variety of types of aluminium ladders, which have such features as the non-slip rung, hollow for light weight but corrugated for strength, quick release extension clips, a special form of safety extension, and a lightweight side section of extruded aluminium, giving great strength. Single ladders ranged from 12 ft. to 20 ft., double extending ladders from 8 ft. and 6 ft. to 20 ft. and 20 ft., and triple extended ladders from triple 10 ft. to triple 16 ft. All the ladders shown were fitted with special non-slip, solid moulded rubber feet.

Mavor & Coulson, Ltd., decorated their stand with an attractive revolving perspex globe. Exhibits consisted of sectional belt conveyors, low friction grit-proof idler rollers, and a 20 h.p. driving gear. The ease of running of these belt conveyors was explained by the idler rollers on display. The idlers were made for belts from 12 to 60 in. wide, and with three or five pulleys to the set. Friction was reduced to the lowest possible amount with any type of bearing by specially made ball bearings and by the method of mounting. A life-size cut-out photograph explained vividly how simply the sectional belt conveyors could be installed and extended. The compact driving gear for belt conveyors shown is made in various widths, to take belts up to 36 in. wide. With a 1,000 r.p.m. motor, it can transmit 20 h.p. when the belt speed is 400 ft. per min. Larger driving gears are available for greater power, up to a size that can transmit 200 h.p.

R. H. Neal & Co., Ltd., exhibited three cranes, two of which were being shown for the first time. The type 'GM' mobile crane with 15 cwt. capacity, was mounted on pneumatic tyres, had full-circle slewing, with alternative jibs and telescopic masts up to 40 ft. high. It travels and steers with the jib in any position. The type 'R' mobile crane of 10 tons capacity at 11 ft. 6 in. radius, with 30 ft. jib, was fully mobile without out-riggers, and mounted on eight pneumatic tyres, with power assisted steering. The crane shown was fitted with a 45 ft. jib, with maximum capacity of six tons at 16 ft. radius and three tons at 26 ft., and with a double-rope grab. The type 'W 12' travelling tower crane was a new type of power-operated portable crane with a maximum capacity of 2½ tons at 19 ft. 6 in. radius up to 113 ft. high, or 12 cwt. at 52 ft. 6 in. radius up to 65 ft. high. Scale models of larger size travelling tower cranes were also on view.

Newton Chambers & Co., Ltd., chose as representative of their range of NCK machines a model 605 excavator. The machine exhibited was the diesel-driven, crawler mounted type, equipped with face shovel attachment. It was convertible for dragshovel, dragline, crane and grab crane operation.
and grab crane operation. A range of photographs showed examples of the work on which NCK machines are employed in all parts of the world.

Chaseside 1-ton crane laying 21 ft. lengths of 24 in. pipe. Excavation crossing main Leeds-South road is 14 ft. deep.

E. Pass & Co., Ltd., exhibited a considerable range of products, notably under-pressure tools and appliances of various types. For instance, examples were shown of under-pressure branch connections for mains of all sizes, ranging from 2 in. to 36 in. diameter. Also, pipe cutting machines were on view, which embraced such features as an independent saddle bracket to assist in setting the cutting machine truly concentric about the pipe. Other products shown included hydraulic thrust boring machines for service and cable laying, asbestos cement turning and cutting machines, racket screwing stocks and dies, leak clamps, and mains spraying devices.

Pegson, Ltd., in addition to showing a representative selection of crushers and various types of road rippers, rammers, and centrifugal pumps, exhibited two of their well-known coal and coke handling screens. Features of these vibrating screens are the location of all bearings and rotating parts in the most accessible positions in order to reduce to the minimum the time required for maintenance work, and their low running cost. The self-priming centrifugal pumps differ from other types in their use of the patented turbine or diffusing priming principle which supersedes all mechanical aids for recirculation. Diffuser priming advances the science of centrifugal pumping by incorporating within the design of casing and impeller a diffuser ring. This, by its ability to retain a flow of liquid, ensures that when pumping ceases a sufficiency of water is held in the pump to create the necessary vacuum in the hose and thereby produce a quick priming when pumping recommences. Other features of these pumps include an exclusive mechanical seal where the shaft enters the tank housing, and a non-clogging open type impeller.

Powers-Samas Accounting Machines (Sales), Ltd., exhibited a typical installation of punched card accounting equipment. The standard range of machines shown included the automatic key punch for creating the punched card unit records, the automatic verifier which verified the accuracy of the punching, the sorter which mechanically arranged the punched cards in any desired order at a speed of 24,000 card passages per hour, and the tabulator which automatically produced the complete accounting or costing record from the punched cards at a speed of 100 card passages per minute. This equipment was seen at work on the production of the various accounting returns of a local authority, such as stores and centralised costing records, expenditure and commitment records, creditors' records, etc.

The Rawlplug Co., Ltd., presented visitors with an astonishing variety of their fixing devices. In addition to the well-known Rawlplugs, there were Rawlbolts, a heavy-duty dry fixing which eliminates grouting, in two types, loose bolt and bolt projecting, in convenient lengths from ¼ in. to 1 in. diameter.
Rawltools for accurate, speedy hole boring included Rawldrills and Stardrills. Other tools shown were tubular boring and wallboring tools for penetrating right through walls, hand-driven mechanical tools and electric and pneumatic tools; these were demonstrated to show comparative speeds in various materials. Durium tipped masonry drills could be used in a hand brace. Silent in operation and quick in penetration, they were ideal for drilling tiles and hollow blocks, as the rotary action did not break away the back of the material.
Rawlties, Rawloops, and Rawlhangers were new devices for speedy erection, dismantling and re-use of timber formwork in concrete constructions. No props were required, the shuttering becoming the template, and the positions of bolts being constant. Demonstrations were given daily on the most efficient methods of making firm fixings in all materials from thin wall-boards to concrete.

Ruston-Bucyrus, Ltd., exhibited the '22-RB,' the most recent addition to their range of excavators. It is a universal machine with a rated dipper capacity of ¾ cu.yd. and can be equipped with shovel, dragline, dragshovel, skimmer, grabbing crane or lifting crane front end equipments. Two alternative power units are offered: A 'Ruston' type diesel engine of 66 h.p. or an electric motor of 40 h.p. continuous rating. The design of the '22-RB' is basically similar to that of the successful '10-

RB' and '19-RB' machines, and all the outstanding characteristics of these machines have been retained. Features of this model include the 'long and short addendum' type of gearing, specially designed caterpillar mounting, and a boom hoist unit of the power controlled lowering type.

Sentinel (Shrewsbury), Ltd., on an excellent and attractive stand, exhibited the following machines: A 'Sentinel' self-contained semi-portable industrial power plant incorporating a type 4 S.R.H.2, 4.75 in. bore by 5.25 in. stroke, 370 cu.in. capacity, four-cylinder horizontal diesel engine. Twelve hour rating was 5 b.h.p. at 1,500 r.p.m. Also shown was a self-contained semi-portable diesel electric generating set incorporating Sentinel type 4 S.R.H.2, 6.08 litre capacity, four-cylinder horizontal diesel engine. Output of this set was 35/40 kW, three-phase, four-wire, 50 cycles, at .8 power factor, running at 1,500 r.p.m. Other machines exhibited were the type 6 S.R.H.2, 4.75 in. bore by 5.25 in. stroke, 558 cu.in. capacity, six-cylinder horizontal diesel engine, and a section of a type 4 S.R.H.2, 4.75 in. bore by 5.25 in. stroke, 370 cu.in. capacity, four-cylinder horizontal diesel engine.

Thomas Smith & Sons (Rodley), Ltd., included on their stand two excavators. The Smith '21,' the larger of the two, has a bucket capacity of ¾ cu.yd., extra-wide crawler tracks, and a powerful six-cylinder oil engine. The driver has a wide range of vision and is completely protected from the weather in a large, well-designed steel cab which houses the engine and all the machinery. The other model was the 'Super Ten,' which has a capacity of ½ cu.yd. (although, of course, both models have larger capacities for coke). This has a slewing speed of 4½-6 r.p.m. and a travelling speed of ½-2½ m.p.h. The engine is a three-cylinder 33-50 b.h.p. diesel.

The **Stanton Ironworks Co., Ltd.,** included on their stand exhibits from their cast iron and concrete products, aerial photographs of the works, and mechanical devices. Included in the cast iron exhibits was the bolted-gland flexible joint for large diameter pipes, and the section shown was of a 24 in. diameter pipe. For pipe sizes up to 10 in. diameter the screwed-gland flexible joint was shown, and a continuous mechanical demonstration was given throughout the opening hours of the exhibition. Various smaller special castings for gas and water pipe lines were shown, together with sections of concrete-lined spun iron pipe. Eight Stanton spun concrete lighting column designs have received the approval of the Royal Fine Art Commission, and scale models of four of these columns were shown in the concrete side of the stand. Other concrete products were represented by sections cut from manufactured articles too large for inclusion. A sectioned Stanton-Cornelius flexible joint, and a Stanton-Cornelius double seal joint were also exhibited.

Stewarts & Lloyds, Ltd., had two stands at the exhibition. One was devoted to a demonstration of the anti-corrosive efficiency of bituminous internal and external protection of steel pipes and of galvanised coating. In the centre a rotating 4 ft. length of 24 in. diameter pipe with a layer of standard seamless bitumen asbestos sheathing was subjected to a searching test by the 10,000 volt 'Holiday' spark apparatus—capable of detecting the minutest pin-hole in the sheathing. Behind this exhibit, two lengths of 18 in. diameter steel pipe were subjected to acid water. One was bitumen lined and the water flowing from this showed no reaction for iron, whereas the unlined tube gave a clear reaction. Other exhibits included samples of protected pipes, with particular reference to methods of continuing protections at joints. The exhibits on the other stand were designed to show the wide limits within which S. & L. manufacture steel tubes for all purposes and included a selection of tubular steel fabricated work designed and manufactured by Tubewrights, Ltd. Samples of steel tubes and fittings for the conveyance of water, gas, sewage, air, steam, oil, etc., were on show, and photographs illustrated important installations in all parts of the world. A series of large colour transparencies illustrating five stages of production from ore quarrying to the finished product were also displayed, as well as examples of tubular steel lighting columns showing the complete range manufactured by the Company.

Victor Electric Hammer Drill.

Turners Asbestos Cement Co., Ltd., on a very attractive 'canopied' stand, featured a display of 'Everite' asbestos cement pressure pipes in a wide range of classes and diameters and made to British Standard 486, and of the asbestos-cement screw joint which, like the pipes themselves, was immune from corrosion and could be assembled in less time than the cast iron detachable joint. In addition, there was a most interesting collection of 'museum' pieces, showing the excellent condition of pipes laid in aggressive soils over varying periods. The stand itself was clad with asbestos cement sheets as an example of the effective design which can be achieved with the careful use of sheets of varying patterns.

Victor Products (Wallsend), Ltd., introduced a new electric hammer drill, the design of which included a number of novel features for a drill of this type. It operated from single phase supplies and while only weighing 16 lb., had a reciprocating impact of an extremely high standard. In addition to its hammer action, it had the added advantage of drilling in hard materials without the need for manual rotation of the drill. It therefore had a great variety of uses for chiselling, tamping, drilling, etc. The company manufactures a complete range of lighting fittings, including lamps, switches, fuse boxes, distribution boards, etc. All items are interchangeable, and the lighting can be extended or reduced at will, arranging lamps in clusters if desired. These fittings are certified flame-proof for groups 1, 2 and 3 gases. Also shown were unbreakable lighting fittings which had been adapted and are now used for street lighting, yard and area lighting, passages and tunnels. The chief feature is an almost unbreakable glass, similar to that used in war-time tanks, which provides high illumination and withstands rough usage. These fittings covered a range from 40-150 watts.

Thos. W. Ward, Ltd., had an excellent stand rendered particularly attractive by the brick walls and the use of flowers. Plant and equipment shown included boilers, air receivers, tar boilers, scaffolding and fittings, pipes and tubes, jacks, pumps, pressed steel tanks, welding trolley, electric motors, auto-trucks, and a variety of contractors' hand tools. Machinery on display featured a hydraulic tractor loader, a mobile loader conveyor, mobile hoist tower, winches, saw benches, cutting machines, air compressors and tools, and a diesel locomotive. The machines were finished in an unusual silver-gold finish. Supporting this wide variety of plant and equipment were photographs depicting other aspects of the firm's public service activities, including cement making and distribution, roadmaking, iron and steel supplies, structural steelwork, and many others.

Warsop Power Tools, Ltd., exhibited for the first time their new and improved breakers and rock drills. Although similar in appearance to the well-known 'S.6' breaker and 'D.P.' rock drill, the makers have utilised new materials. By the employment of light alloys, a useful reduction in overall weight has been secured without affecting power of blow. The new breaker is identified as type 'S.7' and the rock drill as type 'H.D.' On this stand also was shown an interesting range of self-priming centrifugal pumps recently introduced by the Warsop company. This range extended from 1½ in. portable to 4 in. mobile, and included both petrol and diesel-driven models—all with a remarkably low weight-to-capacity ratio.

Wiggins-Sankey, Ltd., demonstrated for our benefit the 'Ductube' process for moulding ducts in any type of concrete. Briefly, a specially designed inflatable rubber tube is laid in any type of concrete, in any form desired, and when the concrete has set the 'Ductube' is deflated, automatically freeing itself and being withdrawn for re-use. Six sizes are available, from 1 in. to 4 in. groups of 'Ductube' being used for larger sizes. It is supplied in 60 ft. lengths, giving a 50 ft. clear working length. Longer runs are made by joining two or more lengths together.

SHORT PAPERS FROM WALES

In place of the usual full-length paper, five short papers were presented in quick succession at the Annual General Meeting of the Wales and Monmouthshire Section of the Institution of Gas Engineers at Newport on September 20. Abridged reports of the papers are given below.

Chimney Draught Control

By D. E. WEST,

Engineer and General Manager, Merthyr Tydfil and Dowlais Undertakings.

THE amount of fuel which can be burned in any combustion vessel depends: (1) On the rate at which oxygen comes into contact with the incandescent combustible substances whether they be liquids, gases, solids or combinations thereof; and (2) on the rate at which the resultant products of combustion can be removed from the combustion chambers.

Various methods can be introduced to control the rate at which it is desired to burn the various fuels and so with automatic controls coupled with modern instrumentation operators can, with suitable plant, obtain the high efficiencies so essential in these days of high initial fuel costs.

This brief paper is intended to deal to some extent with the problem of control of removal of products of combustion from the smaller standard type of town gas plants which are not equipped with mechanical means of so doing.

Taking for example a horizontal retort bench of four beds of 10 ft. stop ended retorts, one usually finds a chimney approximately 2 ft. 6 in. by 2 ft. 6 in. at inside base and anything from 40 ft. to 75 ft. in height. The velocities at which the hot products flow upwards and from the chimney not only vary from day to day, but indeed from hour to hour, due to factors such as changes in the atmospheric temperature, wind speeds, ash in producers, dust in flues, infiltration of air and, of course, any manual alterations in combustion rate settings.

The amount of coal carbonised in the example plant would be in the region of 350 tons per month from which one should reasonably expect to produce for sale to the public some 158 tons of coke or 9.0 cwt. per ton coal used.

With coke at 68s. 5d. per ton on works, a modest 10% increase in coke sold would in this case increase revenue by £54 1s. per month, certainly a substantial sum for any small works producing, say, 50 mill. cu.ft. per annum. It is suggested that one method of achieving this potential increase in revenue is by means of introducing some form of control of retort house chimney pull.

To install expensive automatic gear with its subsequent power costs and skilled maintenance would not be a practical proposition. The other alternative appears to be to control draught by the simple method of admission of air in varying volumes at the chimney base. It is realised that waste heat steam boilers incorporating induced draught fans can maintain the required draught conditions. It is extremely doubtful, however, if a case can be made for such an installation on the size and type of works referred to.

To the engineer and manager of such a plant who desires to do something quickly and cheaply about his 'coke available for sale,' it is recommended that a simple modified form of controller designed in 1946 after some experiments should be tried. This was based on the old principle of air admission at chimney base. The resulting device definitely assists in maintaining pre-determined conditions in retort settings. Taking into consideration the fact that maximum natural draught at the base of a horizontal retort house chimney as described is not normally greater than 0.5 in. W.G. and more often about 0.3 W.G., very slight increases in waste gas velocities can cause substantial increases in producer fuel consumptions with obvious effects upon life of settings, maintenance and revenue from coke sales. The controller referred to is designed for installation at the base of any suitable chimney at the point where an inspection archway is incorporated.

It consists of a M/S angle frame at the top of which is fitted a turned metal rod approximately $\frac{1}{2}$ in. diam. From this depends a light alloy flap suitably hinged to the rod by means of knife-edged bearings. Near the base of the light alloy flap provision is made for loading to give an opening of 3-4 in. on a calm day. The unit is comparatively inexpensive, and the overall size of a controller suitable for a 60 ft. chimney would be approximately 1 ft. 9 in. high by 1 ft. 6 in. wide.

During strong winds or increasing chimney temperatures, the light alloy flap is drawn inwards so that an increased volume of air is passed into the chimney instead of increased waste gases. Again, as conditions become reversed so the flap returns to its original position. Maintenance is practically negligible. All that is required is an occasional oiling of the bearings.

Electrical Safety in the Gas Industry

By D. A. PICKEN,

H.M. Electrical Inspector of Factories, North West England and North Wales.

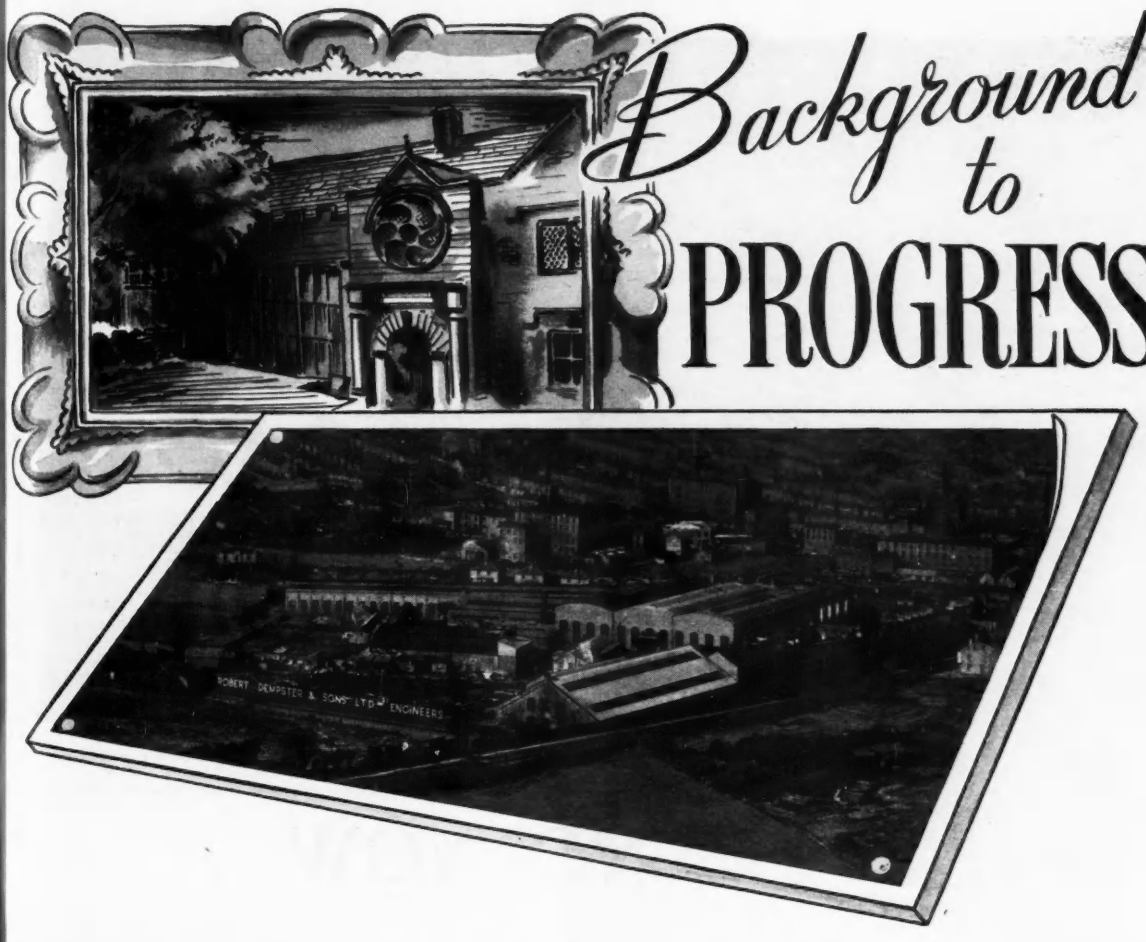
IT is a little incongruous that an electrical inspector of factories should be invited to talk to a body of gas engineers, but the gas industry is so rapidly electrifying its various processes that the danger of accidents has become a permanent feature and there have already been one or two unfortunate accidents. The risks commonly associated with electrical plant are present in gasworks, together with special ones associated with inflammable and explosive atmospheres, and it is suggested that the gas industry, when planning an electrical addition, should acquaint its electrical engineers with the particular risks involved and also arrange the layout of the plant so as to segregate the specialised risks as far as possible.

Plant which is not essential to the operation within the inflammable area should be kept apart. For example, it is not unusual to find a socket outlet arranged at the doorway of a building containing a potentially inflammable atmosphere when the plug is primarily to supply power to some apparatus which is to be used outside the building. Frequently isolation switches for plant like oxide disintegrators and portable conveyors, etc., are located in booster houses, and this incurs risk of conflagration unnecessarily.

Expense and risk can be minimised by separating risks as far as possible; for example, grouping apparatus which is associated with a particular section of the process in one house and excluding other plant so that the whole of the apparatus in a house can be isolated at the same time. If a works were to use a duplicate set of boosters and exhausters it is suggested that one set of booster and exhauster be put in one house without other plant, and the second in another house; then when maintenance was being carried out on either pair the alternative pair would be in operation, and the whole of the apparatus in the house under maintenance could be isolated with the exception of possibly the lighting. The maintenance problem is particularly difficult as experience shows that inflammable concentrations are more likely to occur at these times than at any other and therefore special precautions should be taken.

Apparatus which must be used in potentially inflammable situations should be of flameproof construction and tested by the Minister of Fuel and Power for compliance with the appropriate specification, either B.S. 229 or B.S. 889. Instruments, telephones, and such like apparatus should be either flameproof or intrinsically safe. Prior to maintenance adequate cleaning of the plant with inert gas is desirable, and tests should be taken before allowing personnel to work on the plant, or after maintenance before allowing the apparatus to be put

(*Continued on p. 355*)



Background to PROGRESS

Elland has a history which extends to before the Norman Conquest, and it is interesting to note that in A.D. 1317 Edward II granted a Charter to Sir John de Elland, which gave him the right to hold "A Market and two Fairs" in the town. Elland Hall, illustrated above, with its unusual rose window, is a good example of early Seventeenth Century West Riding Architecture.

Whilst Rose Mount Iron Works cannot claim an origin as remote as the town in which it now occupies the leading industrial place, it can modestly point to a steady growth extending for nearly a century. From 1855, when Rose Mount Iron Works came into being, Dempsters of Elland have steadily built a tradition for sound construction and technical excellence in Gas Works Plant, with an extensive range, comprising :—

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ELECTRICAL SAFETY — continued from p. 350

into commission to ensure that the mixture contained in the plant is not within explosive range.

Additional precautions should be taken against an inflow of gas due to valve leakage. These should consist of either adequate water seal or alternatively slip plates plus a break in the pipe system, preferably outside the building in which the maintenance is being carried out. A strict control system of all work should be instituted, and no maintenance work should be carried out on any piece of plant without authority from the appropriate process supervisor.

Apparatus which is essential to coal handling plant, such as motors, stop buttons, etc., should be totally enclosed and of dust-proof construction, and fuse boards, starters, etc., should be mounted outside the plant in a clean atmosphere though protected adequately from the weather and corrosion. Routine tests on portable conveyors should be carried out at regular intervals.

The same type of precautions should be taken in retort house and water gas plant, as the chief problem to be dealt with is carbon dusts. For retort and generator maintenance a low voltage system for portable lighting should be installed. Where the installation is in the neighbourhood of hot apparatus special precautions should be taken against deterioration of the apparatus by installing mineral insulated cables such as asbestos or Pyrotenax. Adequate ventilation is necessary for safety as well as comfort. In the case of ammonia scrubbers the electrical plant should as far as possible be segregated, as most plant contains a considerable amount of copper, which is adversely affected by ammonia fumes.

The author's experience leads him to believe that for gas purifiers total enclosure is not necessary, and lagging of the boxes is less expensive and safer than the construction of an elaborate protection. All apparatus in enclosed systems should be of flameproof construction, as should the apparatus for use over boxes, even in the open. Routine tests should be carried out on the oxide disintegrator electrical apparatus, and this is a particularly difficult duty for which duplication of the earth cores is very desirable.

Good ventilation should be arranged for booster and exhauster houses, and electrical apparatus should be flameproof. Lighting should be of flameproof construction with intrinsically safe lighting for portable inspection lamps. The objection to the flameproof type of portable lamp lies in the vulnerability of the flexible lead, though where no alternative is available a metallically screened lead with earth leakage protection may be utilised.

Apparatus used inside gasholders or directly over the seals, such as limit switches, etc., should be of flameproof construction. The electrical installation on by-product plant should be flameproof to Group 2, or for standardisation with other sections of the works it is probably better to specify Group 3, as for apparatus other than motors there is little or no difference in either price or design.

The following papers are recommended for study: The Electricity (Factories Act) Special Regulations, 1908 and 1944; B.S.S. 229; B.S.S. 889; the Institution of Gas Engineers Voluntary Rules for the Safe Operation of Purifiers; and the Institution of Electrical Engineers Industrial Fire Risks (Mann and Fordham Cooper).

Unaccounted-for Gas

By A. H. DYER, Newport, Mon.

UNACCOUNTED-FOR gas is not given the attention it deserves, and is usually only considered when at the end of a yearly or half-yearly period, the figure has materially altered from previous periods.

A report to the Institution of Gas Engineers in 1938 stressed the need for obtaining accurate registration and correction at station meters. This is reasonably easy on most works, but in many undertakings no similar corrections are made for the individual meters at consumers' premises. We thus arrive at a point where, assuming a leak proof distribution system, the two sets of figures do not balance.

In some undertakings corrections are made on the volume of gas registered at consumers' meters to bring the figures more into line.

The difference between gas registered by the station meters and the aggregate of consumers meters is usually spoken of as 'Unaccounted-for gas,' and this difference in volume is composed of several factors The most important of these are temperature, pressure, meter inaccuracies, leakage from mains and services, leakage from gasholders, errors in estimation of consumption on gas lighting, etc., consumers' meters not read simultaneously, and condensation of water vapour.

The gas is corrected at the works to 60° F., but in most areas the temperature at the consumers' meters is less than this. The volume thus registered is less than the volume supplied from the works corrected at 60° F. As a result we find that some undertakings have decided either to correct the gas supplied from the works to 55° F. or correct the gas registered at consumers' meters by arriving at a temperature figure which will obviously vary with the locality of the undertaking.

In the recommendation of the Institution of Gas Engineers a method of computation is given whereby the average temperature of the gas at the consumers' meters can be estimated. The average daily shade temperature is taken as the arithmetic average of the maximum and minimum shade temperature for the day. From the table given in the recommendations this average can be converted to the estimated average gas temperature at the consumers' meters.

Some undertakings have already put these recommendations into operation and I wonder whether any member present can say whether this average temperature has been proved reasonably reliable in practice.

In some undertakings the pressure thrown by the holders is added to the barometric pressure. This is being increasingly done on bulk supplies, but it must be remembered that the gas is also registered at consumers' meters under, in many instances, widely varying pressures.

Meter inaccuracies undoubtedly are the greatest cause of unaccounted-for gas. Under the present method of testing meters a variation of 5% (2% fast and 3% slow) is permitted. To obviate this as much as possible, special attention should be made to the regular testing of station meters and large industrial meters. In the case of domestic and other meters the loss can be minimised by *in situ* testing. From our own experience the number of meters fixed on the district which do not register correctly under all conditions is considerable. At one period we were able to bring in for test, and if necessary repair, all meters which had been in use for a period of seven years. From many thousands of tests it was found generally speaking the meters were in favour of the consumers. There are many appliances which have by-passes fitted with very low rates of flow. This is instantaneously varied from, say, ½ cu.ft. per hour to 200 cu.ft. per hour and it is often found that a meter correct at 200 cu.ft. will fail to register at the lower rate. When it is considered that this lower rate is occurring over the greater period of the day it will be seen that a considerable percentage is unregistered.

Until such time as it is obligatory to test meters within a specified time, it would appear that an organised system of site tests should be made.

It has been stated by one authority that 'unaccounted-for' to the extent of 5% of the make can be attributed to consumers' meters made up as follows:

	%
Bias allowed on new meters ...	0.5
Slow through over driving ...	1.0
Unregistered gas	1.25
Slow owing to condition of meter	2.25
	5.00

This serves to emphasise the attention to be paid to systematic attention to meters coupled with the necessity of fixing adequate capacity meters in suitable positions.

Station meters also require attention. How many of these are correct, especially when the volume passing fluctuates considerably as with the starting up or shutting down of a C.W.G. plant?

It is the usual practice to test the larger meters with smaller meters proved correct under test. In many cases the test is therefore carried out at rates as

low as 5% of rated capacity. The difficulties involved in testing at rated capacity are appreciated, but it is fair to assume that any meter correct at 5% capacity is also correct at full capacity.

In most efficient undertakings the actual loss from mains and services is comparatively small as all known escapes are given immediate attention. To keep the distribution system up to date a percentage of the mains and services should be renewed annually. When conditions were more favourable it was the usual practice to have a planned relaying programme and in our own case areas were scheduled for renewal and mains and services were completely renewed. It was found that this reduced the unaccounted-for considerably.

This brings in the question of the correct laying of mains and services.

In some undertakings employees without training have been employed in this work with disastrous results. Training for main and service work is equally as important as training for any other branch of the industry. A large part of the capital expenditure of an undertaking is buried in the ground and can only be seen again by means of expensive excavation and reinstatement. So much can be hidden that it is imperative to give this work adequate supervision.

The normal monthly examination of gasholders should show up any leaks which must be attended to immediately. Most undertakings provide the supply of gas for public lighting un-metered. This can be the source of considerable unaccounted-for gas if the volume of gas consumed is not accurately estimated.

The numerous consumers' meters cannot be read simultaneously and consequently any variation in the rate of consumption will be reflected in the unaccounted-for gas. In our own case the collection of prepayment meters is commenced on the first day of each quarter and proceeds for 10 weeks when the same personnel read the ordinary meters. This time lag can, with the variation in season, affect the unaccounted-for during the various quarters of the year.

Condensation

The question of condensation can be of serious import when there is a high degree of saturation. In our own case the gas from the coke ovens is saturated when metered and as much as 50/60 gal. of water is pumped per day from the first two syphons. This water in its vapour state was registered on the meter and represents a considerable volume lost.

There seems to be little consistency in methods of arriving at the unaccounted-for gas figure. These are often expressed as a percentage of the gas made, but it is often more enlightening to compare the volume year by year as the gas made may during a period of years alter materially.

Other complications have arisen in recent years with bulk supplies which are usually metered at source. This often means long lengths of mains before it is received at the works with the greater possibility of leakage than on a manufacturing works.

In many cases the degree of saturation is used in the correction factor, together with a calculated barometer pressure and temperature at consumers' meters.

Standardisation in the method of ascertaining the amount of unaccounted-for gas might, I suggest, be considered by the Wales Gas Board. There are sources of leakage on the works which, although they do not come within the scope of this paper, should be given special attention. Purifier covers, centre valves, etc., unless regularly examined can mean a serious loss of gas. This is not registered on the station meter and so does not come under unaccounted-for gas, but it is of equal importance to draw attention to this as it is to refer to potential sources of loss on the distribution system itself.

Since this short paper was written the Wales Gas Board has instructed the larger undertakings to put into operation the recommendation of the Institution of Gas Engineers. This is a step in the right direction and should in the future permit fair comparison between the various undertakings.

Education

By A. PICKARD (Llanelly) Convener, Swansea Group.

IN view of many queries regarding the new Education Regulations (1948 Revision) it is desirable to deal with some of the difficulties being experienced, with facts concerning the new Associate Membership Examinations, and with the less well-known courses covered by the regulations.

Information concerning the Associate Membership Examination Course has been widely disseminated by the Institution of Gas Engineers, but it is imperfectly understood in many cases and is repeated here in abbreviated form. For more detailed information reference should be made to the Institution of Gas Engineers Bulletin, No. 4, for July, 1949. In the first case, the scheme as envisaged by the 1948 revised regulations was that the proposed course could be met in two ways; either by taking advantage of existing National Certificate courses in mechanical and civil engineering or by means of specially arranged courses, providing for part-time day study in addition to evenings, to be approved both by the Ministry of Education and by the Institution of Gas Engineers (e.g., the Wrexham Courses, arranged for and agreed in December, 1949).

The regulations provide that the complete course shall consist of the common preliminary examination of the Engineering Joint Examination Board, or exemption therefrom; joint Section A examination, conducted by the Institutions of Civil and Electrical Engineers (the course for this examination is a course for ordinary certificate in mechanical engineering); and joint Section B, Group VIII, examination conducted by the Institutions of Civil and of Gas Engineers. This is a Higher National civil engineering course, but with a specialised subject of gas engineering, either manufacture or supply, incorporated therein.

Two queries in connection with these have frequently arisen recently in this area.

With regard to exemption from the common preliminary examination of the Engineering Joint Examination Board, the Wales Gas Board articled pupil scheme stipulates that a minimum qualification for acceptance as a pupil shall be School Certificate or its equivalent; some engineers appear to have had the impression that the holding of School Certificate or its equivalent gives automatic exemption from this common preliminary examination. This is not so. In the case of the Wrexham course it was laid down that exemption would be granted if the pupil held School Certificate with credits in the four specified subjects of mathematics, engineering science (or physics), chemistry, and English language.

Applications for exemption should be forwarded to the Secretary of the Institution of Gas Engineers, enclosing either the original School Certificate or a certified copy, with a request that if the applicant is not qualified for exemption he should be informed as to which are the subjects in which he is deficient, in order that he may be allowed to qualify in the deficient subjects only in the next common preliminary examination which is held in April and October each year in London, and at other centres as determined by the Joint Examination Board. Applications to sit for subjects at such examinations must be in the hands of the Secretary of the Institution not later than February 21 for the April examination and August 21 for the October examination.

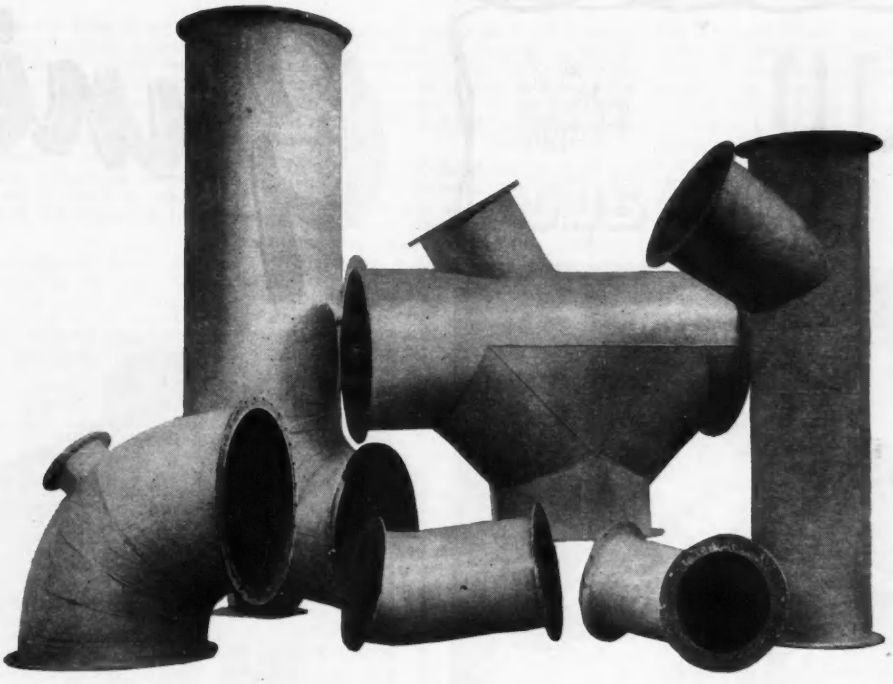
It will therefore be appreciated that if applicants can be secured with the School Certificate Credits indicated by the Wrexham Course as stated above then exemption is assured and the pupil will be able to get off to a good start on the main Examination Course.

The second query concerns articled pupils and the course for which they should enrol after having secured exemption from the common preliminary examination. A board circular dated August 10, 1950, advised such pupils to 'approach the nearest technical college which provides courses for the National Certificate in mechanical engineering with a view to enrolling for the 1950-51 course commencing in September.'

This was queried by several engineers in view of the fact that the 1948 Revision of Education Regulations states that the Joint Section A examination is conducted by the Institution of Civil and Electrical Engineers.

Where one has to study by taking advantage of existing National Certificate courses, because specially arranged courses are not available, the appropriate courses are the Ordinary National Certificate in Mechanical Engineering for the Joint Section A examination, and the Higher National Certificate in civil engineering, with the specialised subject in gas, for the Joint Section B, Group VIII.

In all cases the pupil should take with



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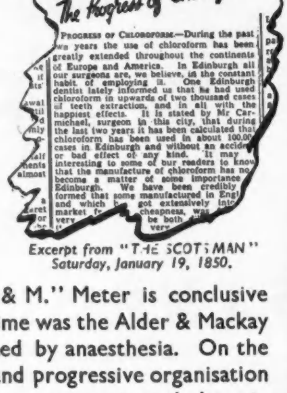

The Progress of Chloroform

PROGRESS OF CHLOROFORM.—During the past two years the use of chloroform has been greatly extended throughout the continents of Europe and America. In Edinburgh all our surgeons are, we believe, in the constant habit of employing it. One Edinburgh dentist lately informed us that he had used chloroform in upwards of two thousand cases of teeth extraction, and in all with the happiest effects. It is stated by Mr Carmichael, surgeon in this city, that during the last two years it has been calculated that chloroform has been used in about 100,000 cases in Edinburgh and without an accident or bad effect of any kind. It may be interesting to some of our readers to know that the manufacture of chloroform has now become a matter of some importance in Edinburgh. We have been credibly informed that some manufactured in England, and which has got extensively into the market [illegible] cheapness, was found to be both [illegible] very [illegible]

Excerpt from "THE SCOTSMAN" Saturday, January 19, 1850.

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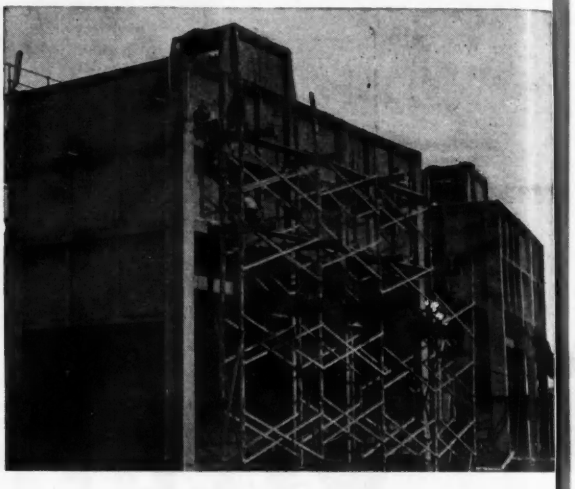

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him a copy of the Education Regulations, 1948 Revision, when approaching the Technical College, stating the Joint Section A examination is the course in which he is interested. It may be that in difficult cases the college may be able to make alternative suggestions where the necessary mechanical engineering or civil engineering courses are not available, which could be referred to the Institution of Gas Engineers for consideration.

Difficulty is being experienced in some districts in attracting the right type of applicant and at a recent meeting of the education committee of the board it was suggested that wider Press publicity should be utilised when inviting applications.

It was also suggested that recruitment should preferably take place during August and September when School Certificate results will have been published; in this respect, however, a quick decision would be necessary since the technical session usually begins in mid-September, and the pupil might lose valuable time at the beginning of the session if his appointment was delayed into October or November.

With regard to the City and Guilds gas fitting courses, it is not fully understood that there are two distinct forms of Final Certificate—*i.e.*, (a) the City and Guilds Gas Fitting Final, and (b) the City and Guilds Full Technological Certificate.

Under (a) the holder has succeeded in sitting and passing the main subject examinations in gas fitting, but either has not taken, or has been unsuccessful in taking, the specified ancillary subjects of mathematics, S.1, elementary science, S.2. and engineering drawing, S.2.

Under (b) the holder has passed the final examination in gas fitting, and has been certified by the principal of a technical college to have attended courses and passed college or local examinations in the specified ancillary subjects.

The holding of a full Technological Certificate will secure exemption from the first year of an approved course in Gas Technology (Supply), also from Engineering Science, S.2, and Chemistry, S.1, in the second year, and from Engineering Drawing, S.2, in the third year. Thus it is important that the better type of ambitious apprentice should be encouraged where possible to take the full technological course with a view to proceeding to take the Gas Technology (Supply) course, thereby qualifying himself to take a more advanced position on the distribution side of the industry than he would otherwise be able to do.

No queries have been raised so far as I am aware with regard to the technology of gas manufacture and/or supply courses, but the possibilities of these courses have not been fully appreciated, particularly by gas undertakings in rural areas; especially in view of the arrangements within the scheme for entry of external candidates from those districts where technical instruction centres are not available.

It is a matter of regret with both the Institution of Gas Engineers and the Gas Council that the number of students coming forward for the gas salesmanship and consumer service course has been unsatisfactory.

The course is based on ancillary subjects to S.1 standard only, gas supply classes to the same standard as the courses referred to above, and the principles and practice of salesmanship is that of the Incorporated Sales Managers' Association.

In a recent interview with Dr. Harvey, of the Cardiff Technical College, I was informed that they had not received any applications in this area for such a course, but he assured me that adequate arrangements could be made providing the required number of students were available. It is to be hoped that the employees on the sales side will give further consideration to the advantages to be derived from attendance at courses such as these which can be completed in three years.

The Ministry of Education has arranged to award 120 Technical State Scholarships in 1950 for students of technical colleges and other establishments for further education, to enable students to pursue full-time degree courses at universities or colleges, etc., leading to an honours degree or qualification of similar standing. Full particulars were distributed by the Ministry to local education authorities and principals of technical colleges, etc., in an explanatory leaflet, U.T., together with copies of the forms of application for the use of candidates (form U.T.2). The principal stipulation is that candidates must have completed a course leading to an ordinary national certificate or diploma or course of equivalent standard (the Ordinary Grade and Higher Grade examinations in Gas Engineering are equivalent to Ordinary and Higher National Certificates for this purpose.

Many of these scholarships will now be awarded, and one has already been awarded to a student at a gas undertaking within the board's area.

The great interest which has been shown by the Wales Gas Board in all educational matters is greatly appreciated, particularly the ready manner in which they have granted time off for studies for students from outlying areas and for the introduction of the articled pupils scheme which will play a most important part in the training and development of gas technicians in the Wales area.

Maintenance of Charging Machine Cables

By H. BLYTHE, Chairman, Colwyn Bay Group.

INSTALLED at one of the small works in the Colwyn Bay group is a horizontal retort charging machine. The actual coal charger of the machine is electrically operated by A.C. motors, the electric supply cable being of the trailing type, coiled on a spring-loaded drum. The drum was mounted in an elevated position above the machine, near to the retort settings and in line of travel of the machine. Heat, smoke and dust, the result of charging and discharging the retorts, shortened the life of the cable to such an extent that six replacements per year were necessary, at a cost of approximately £20.

A scheme for replacing the drum and cable with ordinary figure 8 bare copper wires with trolley poles was put forward by the makers of the machine, but was not accepted for safety reasons; it was considered that the factory inspector would raise objections to the low height at which the trolley wires would have to be placed.

It was therefore decided to carry out an experiment to test an idea that had been suggested. The first part of the experiment was to be carried out at another works within the group where facilities were available.

The experiment was to suspend a set of rope lifting blocks in which the rope had been replaced by an electric cable. The loose end of the cable was secured to the rear end of a road vehicle and the bottom pulley block was just sufficiently weighted to maintain the cable taut without strain.

The vehicle acted as the charging machine, moving backwards and forwards, thus causing the weighted bottom block slowly to rise and fall. After this had been taking place for some time, the cable was carefully examined, but no signs of breakdown of the cable insulation were observed.

From this experiment it was decided to try the idea out on the actual machine, first without purchasing any special pulleys, but using the ordinary rope pulley blocks as in the experiment. The blocks were suspended at one end of the retort house away from the heat and in direct line of the machine to which the cable was attached.

The cable used was one with plastic insulation which had been previously used for other work. It showed no sign of fracture until it had been in use on the machine for seven months, when it was found that the plastic insulation was hardening and cracking. This cable has now been replaced by a rubber covered 44/.012 4-core T.R.S. cable.

With the method now in operation, rubbing contacts on the electrical supply are entirely eliminated.

The results have been so satisfactory that it has now been decided to make a more permanent arrangement, using larger diameter grooved pulleys which, it is thought, will help to give a still longer life to the cable.

The result of the experiment, in brief, shows that this small idea has been well worth trying out.

	£	s.	d.
Suggestion by the makers would have cost the undertaking	97	0	0
Annual replacement of cables as originally fitted, six per annum at £3 6s.	19	16	0
Cable replacement to date on method described above, one per annum at £3 6s.	3	6	0
Annual savings on cables only	16	10	0

It can be estimated that with cable pulleys suitably designed, the cable replacements would not be more than one per annum, which is an appreciable saving in maintenance, very welcome to the manager of a small works.

WEST YORKSHIRE GAS GRID*

TEN YEARS' MAINTENANCE

By L. W. ROBERTS, M.I.C.E.,
North Eastern Gas Board.

The West Yorkshire Gas Grid was devised and planned by Colonel W. M. Carr, C.B.E., the first Chairman of the North Western Gas Board. The initial 52½ miles were constructed in 1939 and between 1941 and the present time the system has been extended to 76¾ miles. The author was in charge of all constructional work and has been responsible for gas distribution and maintenance during the last 10 years. The paper briefly outlines the extent, operation and maintenance of the gas grid and describes in detail the difficulties that have been encountered and the methods of overcoming them. The paper is essentially a practical one. The opinions given are the personal views of the author after carefully considering the and problems that have arisen from time to time.

THE West Yorkshire gas grid at present comprises 76¾ miles of high pressure gas main varying from 4 in. to 18 in. bore. The mains are spun iron with Stanton-Wilson flexible joints, with the exception of five miles of steel main which is 8 in. bore with welded joints. Exposed mains over cuttings and water courses are constructed in steel. Valves are provided in underground chambers and governor houses at approximately one mile intervals and at all branches. Special high pressure syphons are provided at all low points. The maximum working pressure is 30 lb./sq.in.

Gas taken from three coke ovens and two carburetted water gas units is supplied to 18 undertakings and two villages. The quantity of gas at present available for the grid is 15 mill. cu.ft. per day.

Supplies to the gasholder stations are effected by volumetric governors which maintain a predetermined rate of flow irrespective of inlet and outlet conditions. Each governor is fitted with an orifice plate which impulses a flow indicator and recorder. Connersville or B.M. station meters are provided and maintained by the receiving station.

Grid personnel are responsible for the maintenance of all distribution plant up to the inlet of the station meter. Maintenance comprises servicing all valves and cocks, cleaning and painting exposed mains, inspection of the route for signs of subsidence due to mining operations, inspection and maintenance of all governors, flowmeters, and station meters, effecting repairs and attending to all emergencies. A squad of 12 men attend to this work and in addition do a considerable amount of constructional work and mainlaying.

Valves

The valves are parallel faced, having internal screws with stainless steel gate and chest rings. These valves are fitted at intervals in the length of the main, at all branches and the inlet of all volumetric governors. The valve on the outlet of the governors is similar but is not fitted with stainless steel rings.

Considerable trouble has been experienced with trunk main valves by the accumulation of mains dust on the working parts. A film of dust collects on the internal screw, spindle nut, slides and faces, which prevents the valve being closed tightly enough for high pressure gas.

It is imperative that all valves on a high pressure system are absolutely reliable, and various methods have been adopted to bring these valves into perfect working condition. Some valves have been dismantled by removing the dome, taking out all the working parts, cleaning them, greasing and re-assembling. This was not very successful as the grease collected the mains dust more quickly than a dry valve and the mixture of grease and dust increased the trouble.

The dismantling of a valve in service requires the shutting down of a long section of the grid for a period of four to five hours, which is most inconvenient for all interested parties. To try to obviate this a faulty valve was closed, the pressure in the dome was released, and the valve was filled with gas oil. The oil softened and partially broke up the accumulation of dust, and by frequent opening and closing the valve was made good.

This method is not a quick one and the greatest patience must be exercised to make it successful. It may take two men a whole day or more to make a difficult valve easy. Excessive force must not be applied in closing valves. The use of extension bars and levers on keys and hand wheels will strain some part of the valve, usually the spindle nut, and it may then be impossible to move the valve either way. Quite a number of strained spindle nuts have had to be renewed on the grid and one valve failed to open after being forced down.

Having found a remedy a better means of application has been devised. Each valve has an ¼ in. pet cock fitted to the dome. A graphited penetrating oil is injected by a volume pump similar to those used for lubricating heavy industrial machines. This method can be applied to both partially and fully closed valves, although it is generally applied to fully closed ones.

In the early period of grid operation trunk main valves were not regularly moved, but all valves on the inlet to the governor have been opened and closed at regular intervals of two months in the course of governor maintenance. The maintenance records show that only two of these valves have been dismantled for cleaning and these were at the extreme end of supply lines where most dust accumulates. It is true, therefore, that a neglected valve is useless, and the more a valve is used the better it becomes. There are 110 trunk main valves on the system at the present time. Three will have to be dismantled to make them gas-tight, five can be made good by frequent lubrication and movement, the remaining 102 are in excellent condition.

The author suggests that the use of lubricated plug valves up to 12 in. diameter should be considered for high pressure gas mains. When plug valves are open, no part of the machined surface is exposed to the gas stream and there is no obstruction in the valve port to collect dust. They have limitations in the tendency for large plug valves to stick and the difficulty in turning, but these limitations might be overcome by suitable lubrication and regular movement.

Valve Chambers

All trunk main valves are in chambers of brickwork or reinforced concrete. There are two sizes, one 3 ft. 5 in. by 5 ft. 10 in. by 6 ft. high for valves up to 12 in. diameter, the other 4 ft. 2 in. by 6 ft. 8 in. by 6 ft. 7 in. high for valves above 12 in. to 18 in. diameter. These dimensions give sufficient room for two men to stand in the chamber and work in comfort. Easy access is provided by heavy manhole covers 24 in. by 24 in. and 30 in. by 24 in. clear opening. The original covers were placed at the end of the chambers and a 6 in. by 6 in. surface box was placed over the valve spindle.

* Paper at a joint meeting of the Manchester and Yorkshire Junior Gas Associations, Leeds, November, 8, 1950.

The valves which are flanged were fixed to flange spigot and flange socket pieces which passed through the chamber walls. It was thought that if a valve had to be changed it would be simple to withdraw the flange bolts, lower the valve to the bottom of the chamber, place it under the manhole, and raise it to ground level. Such an operation is not so simple, for it is very doubtful that the valve could be moved after the bolts were removed and it is certain that another valve could not be fixed because the pointing material could not be accurately placed.

Manhole covers with a 6 in. diameter chained plug in the centre are now fitted directly over the valve. This makes valve maintenance much easier, and if the working parts of a valve have to be removed they can be drawn straight out with one lift. A further improvement has been introduced by putting a mechanical joint inside the chamber. A space of 1 in. is left between the end of the spigot and the bottom of the socket so that the valve can be easily removed and replaced if necessary.

On the original 52½ miles of the system light manhole covers were fixed in grass verges and agricultural land, but so many have been broken by agricultural machinery and heavy vehicles parking on grass verges that heavy covers are now fixed on all chambers.

Syphons

The syphons used were specially designed for this scheme and are self acting. They are of circular section with a spherical base. The lid may be described as a spherical blank flange. The fittings comprise ¾ in. diameter stainless steel tubes and a cast iron three-way cock. One tube passes through the lid almost to the bottom of the syphon pot forming the dip pipe. The other tube passes through the lid and is used for pressure readings. The third tube rising upwards from the cock is the outlet and is covered by a galvanised iron cap. To clear the syphon of condensate a short length of hose having a half union on one end is screwed to the top of the outlet pipe. The cock is turned to connect the dip pipe to the outlet and the gas pressure acting on the surface of the condensate forces it through the dip pipe and hose. If pressure readings are required, a gauge with a stand pipe is similarly fixed to the outlet pipe and the cock is turned to connect the pressure tube to the gauge.

These rather elaborate syphon fittings have now been simplified by using a dip-pipe and straight through syphon cock. It should be noted that the cock must be straight through so that a blocked syphon can be rodded. Syphons may be blocked by naphthalene or trouble may develop when a new main is put into service if the main has not been thoroughly cleansed of the foreign matter that accumulates during mainlaying. Lubricated plug cocks are fitted to the syphons and it is most important that these cocks are absolutely reliable. Regular lubrication and frequent turning is the best way to keep these cocks in good working order.

As a precaution against flooding of mains by war damage, a number of syphons were fitted with lids having a 4 in. flanged outlet and valve. These 4 in. branches are very useful when sections of the main have to be isolated for repairs. The isolated section can be very quickly cleared of gas after the main stop valves have been closed, and purging is simplified before gas supplies are resumed.

Hatch Boxes

From each coke oven plant hatch boxes with large cleaning covers were placed at approximately 100 yd. intervals for the first 800 yd., and at 200 yd. intervals up to a distance of 2,000 yd. A wire drag rope was left in the main so that cleaning tools could be drawn through the main in cases of obstruction.

One of the coke ovens supplying the grid has no naphthalene washer and the gas contains a rather high proportion of naphthalene. In 1945 the hatch boxes were opened for examination and naphthalene was found between points 300 and 900 yards from the coke oven compressors. It was in large flakes saturated with water and averaged 1 in. deep covering the surface of the pipe. The main is 10 in. diameter and was cleaned by dragging through two iron badgers, one 8 in. diameter and one 9½ in. diameter. These were then followed by two rubber discs 10½ in. diameter fixed 15 in. apart. The whole operation lasted 15 days and gas supplies were interrupted 10 times for periods varying from 6½ to 10½ hr. After this experience the following observations were made :—

100 yd. between hatch boxes is too great a distance for conveniently handling the tackle.

If hatch boxes are used on mains where welded or non-mechanical joints are used they should not be more than 50 yd. apart, and drag wires are not necessary as draining rods can be used as pilots for the cleaning tackle.

Where condensation was present the drag wire had corroded and was unreliable.

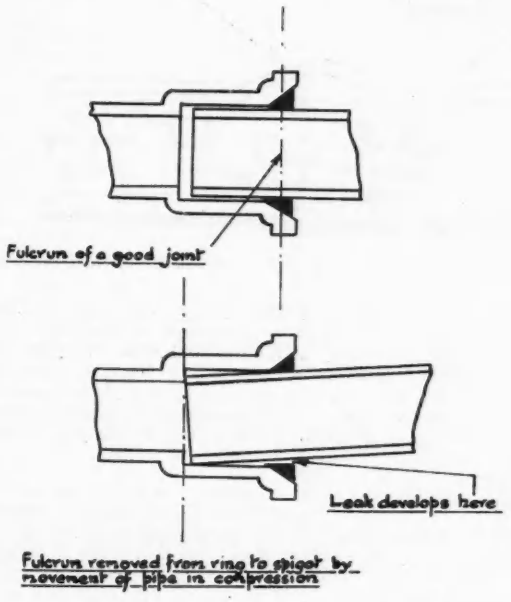
The whole operation is very unpleasant and not without danger. A great deal of time and labour is required to achieve so little, and the work when done does not remedy the trouble.

Where mechanical joints are used the main can be broken at any convenient point.

Mining Subsidence

Of the 76 miles of grid mains 42 miles are in an area where mining subsidence is taking place, and before referring to the effect of subsidence it might be advisable briefly to describe its nature. The mechanics of subsidence is extremely complicated, but reduced to very simple terms, it may be summarised as follows.

When coal is removed from the earth subsidence will ultimately occur at the surface. The depth of the subsidence is



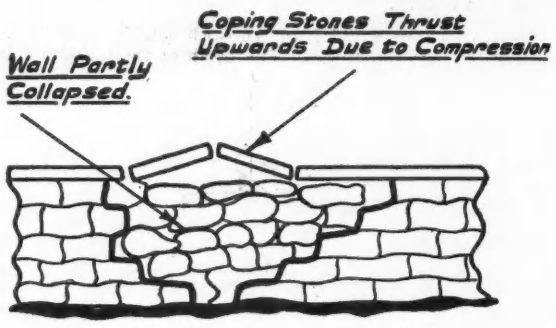
Effect of subsidence on mechanical pipe joint.

never equal to the thickness of the coal seam removed but will vary between 10% and 75% of it according to the nature of the overlying strata and the depth of the seam. It is generally agreed that deep workings have a shallow subsidence curve whereas a shallow seam may have a deep curve and short wave length. Greater damage can be expected with the latter.

The long wall system of mining, which is general in this area, produces a wave action subsidence. That is to say, a transition curve passes slowly across the surface of the ground some yards in advance of the working face of the coal. It will be readily appreciated that as the curve advances any structure in its path will be in a state of tension and in a weak structure failure will occur by the development of tensional cracks. As the curve advances further, vertical subsidence takes place and the structure is subjected to compressive stress and more damage may be caused. The time factor for these two phases may vary from a few weeks to two years after the coal has been removed. After the compression phase has passed, further damage is very unlikely but there will be a general settlement of strata for some time which will vary up to five years.

Leaks do not always follow subsidence, and well laid gas mains and services are not damaged as much as would be expected; but the closest attention should be given to the point where the working face is stopped. Some yards beyond this point there will be a dividing line between subsiding ground and solid ground. This is where severe damage may occur.

When gas mains and other pipes are laid in areas of this nature the essential consideration is flexibility, and only those joints should be used which will allow lateral movement and longitudinal movement in either direction. During the 10 years of gas grid operation there have been 15 incidents where joints have developed leaks. Twelve of these incidents were on flexible joints caused by compressive stresses set up by mining subsidence. It will be noted that the leaks were caused by compressive stresses and it is interesting to consider this statement in detail.



Appearance of boundary wall after subsidence had occurred.

The flexibility of these joints depends on the joint ring, and this ring is the fulcrum of the movement of the pipe. Tension stresses caused by subsidence will draw the pipe outwards from the socket and no harm is done. Compression stresses push the pipe into the socket, and if the spigot is pressed into the bottom of the socket the fulcrum moves from the joint ring to the spigot. The balance of the joint is then upset and a leak develops.

The only way to effect a repair is to remove a number of pipes, two or three are usually sufficient, and replace them with a slightly shorter length allowing about 1 in. of free space to each joint. For example, after two pipes 18 ft. long had been removed the distance between the socket and spigot of the adjacent pipes was 35 ft. 10 in. The main was made good by replacing one pipe 18 ft. long, one 9 ft. long and a cut pipe to allow a clearance of 1 in. in each socket.

In mainlaying it is common practice to push the spigot well into the socket before making the joint, and this was generally maintained on the gas grid. Our experience suggested that by drawing the spigots from the bottom of the sockets distances varying from 1 in. to 1½ in., trouble from leaking joints caused by subsidence would have been reduced by at least half, possibly altogether.

The first few incidents were reported by the public but in the interests of public safety and our own peace of mind this method is not reliable, and a system of walking inspection was introduced. All the collieries operating in the area covered by the gas grid were asked to supply information giving the positions of their present operations and the location of future work. This information was recorded on 6 in. Ordnance sheets and is revised every 12 months. The length of main to be kept under observation is thus reduced to a minimum. All the collieries have been most helpful and we regard the information received as confidential. The inspections are made weekly, in some insolated cases daily. The evidence of subsidence is easily seen and the compression phase of the movement—that is, the one we are interested in—is indicated by creases in the carriage way, lifting curb stones and copings and collapsing walls. Tests for gas are made with a gas leak indicator and if gas is present bar-holes are made in the ground to locate the leaking joint. Arrangements are then made to effect repairs.

The minimum time taken between gas 'off' and gas 'on' was five hours, but in cases of exceptional difficulties 13 hours have been necessary. To ensure continuity of supplies to consumers all the gasholders on the side of the leak remote from the coke ovens have to be filled up. Those between coke ovens and the leak have to be brought down so that they can take the gas produced during the time the repair is being done. The leaking section of the main is then isolated by closing stop valves and the gas in the section supplied into a local gasholder or blown off through a standpipe fitted to an A.R.P. syphon. The preliminary work and excavation is done with sparkless tools of beryllium and copper. When the repair is complete the section of main is purged before the supply to gasholder stations is resumed.

Welded steel mains behave differently from mains having flexible joints. An 8 in. diameter steel main with long sleeve welded joints passes through an area where severe subsidence is taking place. Recently the pressure loss was 8.75 lb./sq.in. The calculated figure for similar conditions was 1.4 lb. The main was uncovered at intervals of 100 ft. for 900 yd. and the levels taken indicated numerous serious depressions, the greatest being 5¼ in. It was suspected that water was obstructing the gas flow and the whole length of the section was uncovered and set to a new fall. This was done by adjusting the line of the pipe to a slight arc in the horizontal plane. No welded joints were broken by this manipulation and the pressure loss was restored to normal. It is evident that the welding in this particular section had been well done and that the rigidity of the pipe and the compression stresses set up by mining subsidence caused snaking.

At another section of the steel main the stresses set up by mining subsidence severely damaged two brick valve chambers. The valves in these chambers were attached to the main by Johnson flexible couplings. Had this not been so, the valve bodies would have been damaged. Three welded joints in this main were damaged by tension stresses. The welding failed at the bottom of the joint and serious leaks developed. Two other joints failed underneath the pipe, not by earth stresses but by inferior welding. The joints of steel mains are generally welded in the trench and a joint hole has to be cut so that the welder can operate under the pipe. In wet ground and in wintry conditions the jointer has to work under very uncomfortable conditions and the welding under the pipe may not be so good as at the sides and top.

The severe subsidence on this section is caused by the working of two coal seams beneath the site. Close observation is maintained by taking levels at frequent intervals. As the route is in a railway embankment, steel tubes set in concrete have been fixed to the top of the main. These tubes extend above the surface of the ground and any variation in the level of the main can be detected without excavating.

Exposed mains over roads, railways, and water courses are constructed of steel tubes supported on steel brackets of simple design. Great care was taken in designing the supports to avoid pockets where corrosion would be encouraged.

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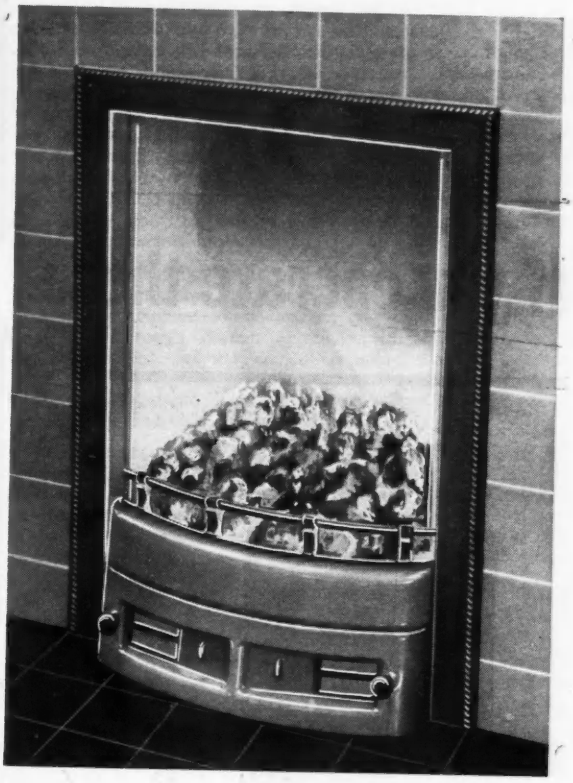

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Tubes were delivered to the site with one coat of red lead paint and after erection they were scraped and wire brushed and another coat of red lead was applied and two finishing coats. The finishing coats varied. On one series of crossings synthetic enamel was used, on another lead base paints, and a third series had graphite paint. All these pipes showed extensive corrosion spots in less than two years. These corrosion spots were scraped and brushed and spot painted with red lead graphite before the whole pipe was painted again with one coat of red lead graphite and two finishing coats of graphite paint. In less than two years extensive corrosion spots appeared again.

All this work was carefully and well done and it was evident that the trouble was under the paint and not in the paint or its application. It was therefore decided to strip completely a length of pipe down to the metal. In 1945, 380 ft. of 18 in. diameter steel tube was stripped of its seven coats of paint by oxy-acetylene flame and wire brushing. While the tubes were still warm a priming coat of red lead graphite was applied. When this had set, two finishing coats of graphite paint were applied.

At the present time, five years after this treatment, there are small spots of corrosion on top of the pipe which are caused by the nails on the boots of young people who walk on the pipes for amusement. The sides and underneath the pipe are in very good condition. They are not perfect, but had the pipes been properly treated in the first place repainting would only be required in seven years and possibly ten. When this pipe was thoroughly stripped of paint numerous patches of corrosion were revealed under a good film of paint. One patch was 2½ in. long and ¼ in. wide and had penetrated well into the tube. Other patches were found under mill scale.

It is evident that the greatest attention should be given to structural steel before the paint is applied and only those faces that fit together in the fabricating shop should be painted before delivery. It is general practice to order steelwork with one coat of red lead paint before despatch to the site, the idea being that this one coat will protect the steel in transit and storage. This is not so, for in transit and erection the so-called protecting coat of paint is severely damaged and corrosion commences in a few hours time. Moreover, it is a waste of time and good material to paint over corrosion spots. It is suggested, therefore, that steelwork should be accepted without shop priming coats and should be de-scaled, de-rusted, rust-proofed, and receive the priming coat at the site. If the structure is complicated and site treatment difficult, this special treatment should be applied at the works, followed by a priming coat of red lead or other inhibitive paint.

Corrosion

In collaboration with the Stanton Iron Works, Ltd., investigations have been made on the corrosion of spun iron pipes. From 1943 to 1949, sections of the grid main have been exposed from time to time and when opportunity has permitted a pipe has been removed for internal and external examination. Seventeen pipes taken from clay, sandstone, sandy loam, and made up ground, varying from 4 in. to 15 in. diameter, have been examined and only one has been affected by external corrosion.

Buried pipes may be corroded by the chemical nature of the soil, stray electric currents, differential aeration, the presence of anerobic sulphate reducing bacteria, subsoil drainage, and improper backfilling of the trench. Analysis shows that some of the soils in which the pipes were buried can be regarded as aggressive, and as some miles of main are in heavy clay corrosion by anerobic sulphate reducing bacteria might also be expected. It will be noted that only one of the 17 pipes removed for examination showed signs of corrosion. The other 16 were in excellent condition and the protective coating was intact. This coating is a coal tar pitch—oil mixture applied hot to hot pipes by the makers. It should follow that if this coat remains undamaged and is impervious to moisture external corrosion should not take place.

The 4 in. diameter pipe that was corroded was laid in heavy clay. The back filling to the trench had not been well done close to the pipe and there was a void approximately 1½ in. wide/deep under the pipe. This would form a drain for subsoil water in wet weather. On close examination patches of clay were found adhering strongly to the pipe and coloured by iron. After the clay was removed patches of graphitic corrosion were found, some to a depth of $\frac{1}{16}$ in., but there was no pitting. Small quantities of sulphate were present in the adjacent clay, and this with the graphitisation of the metal and the presence of sulphides indicates the probable presence of sulphate reducing bacteria which would be a contributory factor to the corrosion.

The author has experience of a gas main in East Yorkshire laid in sandy clay that was extensively damaged by graphitisation. When exposed it was evident that the pipes had been laid on the rough bottom of the trench instead of being properly bedded, and the back filling round the pipe had not been consolidated. This carelessness had caused the pipe to form a natural drain for subsoil water. These conditions may be ideal for anerobic sulphate reducing bacteria.

The problem of corrosion is very complex and it is extremely difficult to determine exactly which of many factors operates in a particular case. It is, however, suggested that except under severe conditions external corrosion of buried pipes can be very much reduced by strict attention to the following points :—

(a) No effort should be spared to keep the pipe coating intact before laying and during laying and backfilling. Manufacturers take very great care in handling the pipes.

(b) Pipes must be properly bedded in the trench and not laid in a rough trench and levelled by bricks, stones, and lumps of clay.

(c) Special care must be given to back filling. Selected fill should surround the pipe and be thoroughly consolidated before the filling is commenced.

Generally the grid mains have no internal protective coating. There is a length of 1,400 yd. of 4 in. spun iron pipe that was coated inside, but it is thought that all this has come off judging by the amount of black dust that has been removed from the end of the main. This dust was mainly naphthalene discoloured by absorption of the pipe coating. Internal examination of the 17 pipes that have been removed indicates that the internal corrosion of high pressure spun iron gas mains is negligible over a period of many years. The pipes show the original blue skin on the inside over the greater part of the surface and only tiny rust spots at intervals. These tiny spots occur where traces of condensate have collected on the surface of the pipe. The bulk of the condensate is deposited within two miles of the coke ovens, and pipes taken from these sections show a band of rust about 2 in. wide on the bottom of the pipe and the maximum depth of penetration of corrosion is very small, something less than one hundredth of an inch. As the distance from the coke ovens increases, the pipes become drier and the original blue skin on the metal is intact.

Dust is carried to the governors by the gas stream and consists essentially of iron oxide, ferric ferrocyanide, some organic matter, soil constituents, and other materials that have got into the pipes during mainlaying. No steps have been taken to reduce its formation but it has been noticed that pipes near the compressors have an internal coating of oil and appear to be dust free.

Steel mains over special crossings have no internal coating and the present internal condition is not known. There is a section of steel main 8,000 yd. long, 8 in. diameter. This is coated with bitumen ¼ in. thick on the outside and was coated with boiled linseed oil inside. The main was laid in 1938 mostly in heavy clay. This external coating is entirely satisfactory, but recently a leak developed and a hole was found ⅛ in. diameter in a patch of corrosion 5 in. by 3 in. The corrosion developed because a patch of the protective coating

had been knocked off in handling or laying the pipe, and had not been repaired before back filling the trench. This again emphasises the importance of careful handling and strict attention to detail in what is unfortunately regarded as the rough job of mainlaying.

The analysis of the surrounding clay was :—

Moisture	23.2%
Soluble sulphates as SO_3	0.065% (dry basis)
Corrosion index (nipple and can test)	medium corrosive tendency.

The internal coating of boiled oil is now almost entirely removed. Large quantities of flakes of boiled linseed oil have been blown from the syphons.

It is known that linseed oil has a tendency to part from the metal surfaces by the action of coal gas and it is suggested that an internal coating of synthetic resin varnish would be more suitable for steel tubes.

These governors are designed to control the volume passing irrespective of the changes of inlet pressure between 2 lb. and 30 lb./sq.in. and a maximum outlet pressure of 15 in. water gauge. The whole equipment consists of a main governor fitted with double beat valves with metal knife edges closing on leather seats; the valves are connected by levers to a bowl diaphragm. Across the main governor is a relay system which controls the differential pressure applied across the bowl diaphragm. This relay system is made up of two small pressure regulators known as J and K governors, a needle valve, and a small spring loaded volumetric governor. The movement of a small hand screw on the latter adjusts the gas flow to any required volume. An orifice plate is fitted into the outlet pipe from the main governor and this is connected to an indicating and recording ring balance flow-meter.

The governor maintenance records show that valve seats in the pressure regulators are changed every eight to 10 months. Small particles of dust in the high speed dust stream erode the small leather seats and they are changed regularly to ensure proper operation of the governor. Diaphragms in the pressure regulators are changed every 12 to 15 months. The main valve seats and pressure bowl diaphragms have a much longer life. In nine years 11 valve seats and eight diaphragms have been required in the 21 governors operating on the grid. The main governors collect dust, very small traces of naphthalene, and some gum. The pressure regulators require cleaning less frequently than the main governor and the grid plate and orifice plate require cleaning every three to six months.

The supply agreements with the coke ovens require the gas to be purified, free from sulphuretted hydrogen and tar; to contain not more than half a grain of ammonia, 12 grains of cyanogen and one grain of naphthalene per 100 cu.ft., and not more than 4% of carbon dioxide, 0.5% of oxygen and 17% of total inert gases; to have an average calorific value not less than 505 B.Th.U./cu.ft.

This specification is maintained by continuous testing at the laboratory attached to the control station.

DISCUSSION

Mr. **H. Partington** (Rochdale), referring to stainless steel fittings, asked who were the suppliers and whether the fittings could be screwed by ordinary tools.

Mr. **Roberts** replied that the tubes were supplied by Accles & Pollock. Old screwing tackle screwed better than new, but it was more satisfactory to order tubes cut to required lengths and screwed by the suppliers.

Mr. **Partington** said that the grid must be very fortunate in storage capacity to be able to fill holders and cut off supplies while repairs to damage caused by mining subsidence were effected.

Mr. **Roberts** said the holder capacity was very limited and each operation had to be carefully planned to the last detail before work commenced. The grid had a first rate gang of men to do the work.

Mr. **W. H. B. Porter** (North Western Gas Board) asked what was the line loss and were tests made on selected lengths from time to time. Referring to exposed mains he favoured paint to protective wrapping and asked for the author's opinion. He also asked if the author fitted dust traps to governor inlets.

Mr. **Roberts** replied that line loss was stable within the limits of 2½-3½%. If a leak developed in a section of the main remote from the public highway it might not be discovered for a day or two and in these circumstances the line loss would increase, returning to normal when the repair was completed. With regard to exposed mains, wrapping might be very effective, but to be sure that it was, the whole of the wrapping should be stripped. Removing small patches was not a sure test. Referring to dust traps the author stated that dust traps had been fitted where dust was expected, but it did not appear at the expected places. Recently dust trouble had developed at two governors. In one place the dust comprised largely the boiled oil lining of a steel main that was disintegrating, and the history of the mainlaying of one section of the grid explained the trouble in the other case. It was thought that dust trouble would decrease with the passing of time, as samples of dust consisted mainly of organic matter, and this fact emphasised the importance of blowing out mains many times before gas was supplied through them. Consideration was being given to the problem of laying the dust in mains, and it had been noticed that pipes taken from the main near the compressors were oil filmed and free from loose dust. The oil was from the compressor cylinders and probably from the direct oil coolers at one of the coke ovens.

Mr. **A. Higgs** (Harrogate), referring to syphon fittings, said that as stainless tubes were unobtainable during the war they had fitted ordinary gas tubes, and he asked how long they would last. He also stated that it was impossible to replace a corroded stainless tube in a high pressure syphon and that they had used the flange on the 4 in. branch of the modified syphon top.

Mr. **Roberts** said he had no experience of ordinary tubes fitted to syphon pots and thought the life would depend on the amount of water deposited and its nature. He suggested that a new dip tube could be fitted passing the hand and arm through the 4 in. branch.

Another speaker, referring to corrosion of exposed mains, asked if smoke baffles were fixed on pipes over railway lines and were any special precautions taken. The author said that smoke baffles were fitted and were treated with sprayed zinc and copper. These had not resisted corrosion as well as expected, but it was now thought that metal sprayings should also be painted but not necessarily with the same paint as that used for weathered steel.

Another speaker, referring to steel mains, asked if butt welded joints were better than long sleeve welded joints. The author's opinion was that the question was rather academic. It was frequently said that a weld was stronger than the metal, but particularly in mainlaying the conditions of the work must be considered. The ideal way to joint a steel main was to weld the pipes on trestles and snake the mains into the trench. This could only be done in an open field and on long grass verges. When mainlaying had to be done in short lengths as in towns and congested thoroughfares the joints had to be welded in the trench and the welder required a joint hole under the pipe in which he had to lie, and he could not do his best work if he was in a pool of water.

Another member thought that to draw a spigot 1 in. to 1½ in. from the bottom of the socket was too much, and stated that in his area trouble developed in drawn joints. The author explained that only 18 in. diameter spigots should be drawn 1½ in. and this distance should be reduced with smaller diameters.

During further discussion the author emphasised the importance of paying particular attention to detail in all phases of mainlaying. He was confident that many of the troubles experienced today could be avoided by raising the standard of workmanship in this essential and expensive necessity. Time and trouble taken in the early stages would be well repaid later. Mr. Roberts also suggested that it might be worth while limiting valves to 12 in. diameter and using reducing pieces in larger mains. Another speaker indicated that with the high costs of compression and lower terminal pressures that would now operate volumetric governors the pressure losses across a series of 12 in. valves would be an important factor in the economics of a new distribution scheme.

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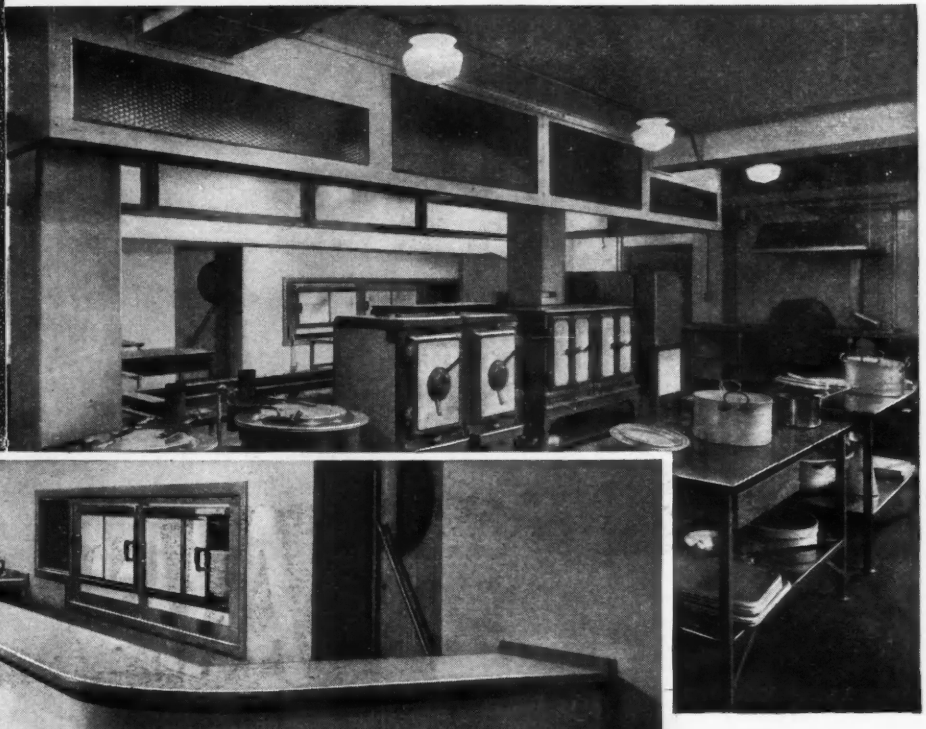

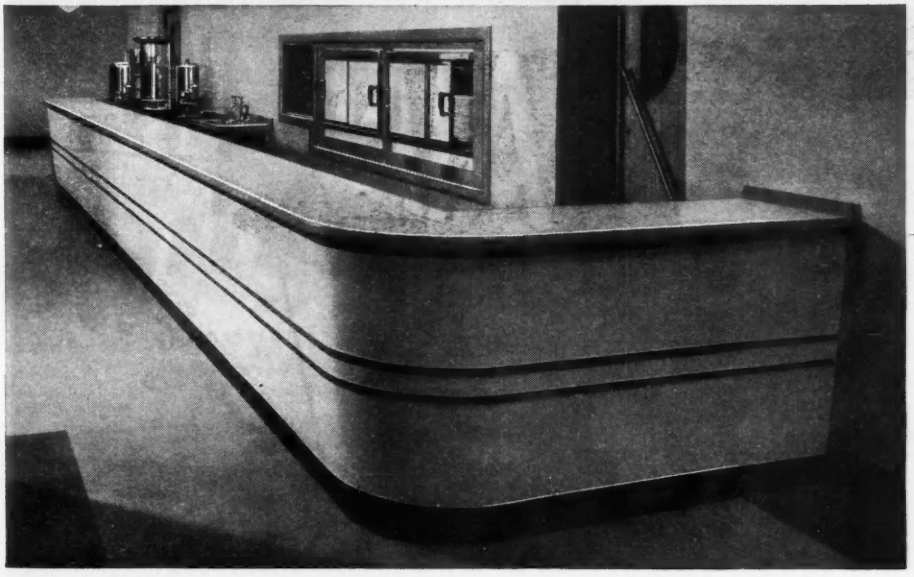

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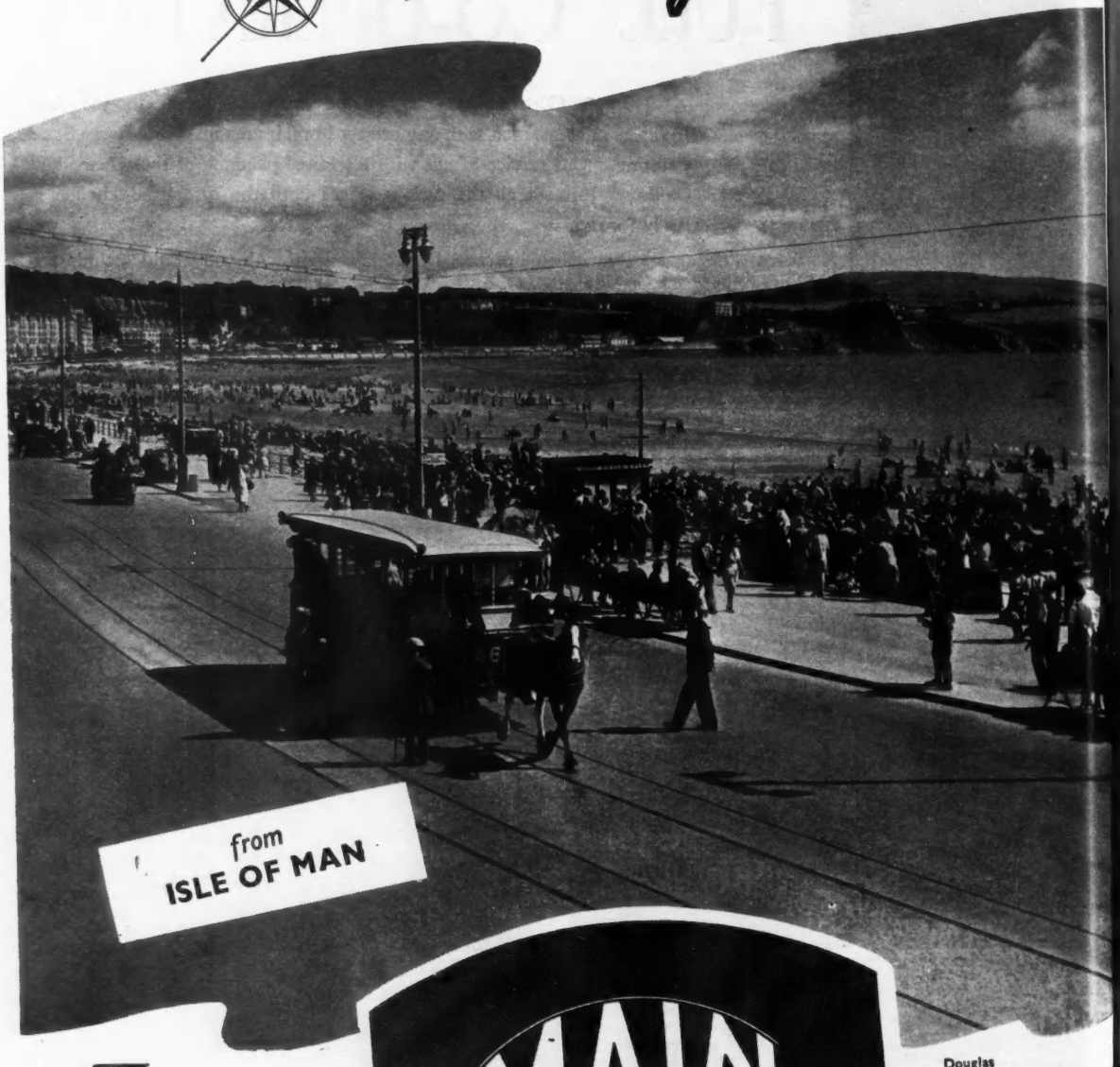

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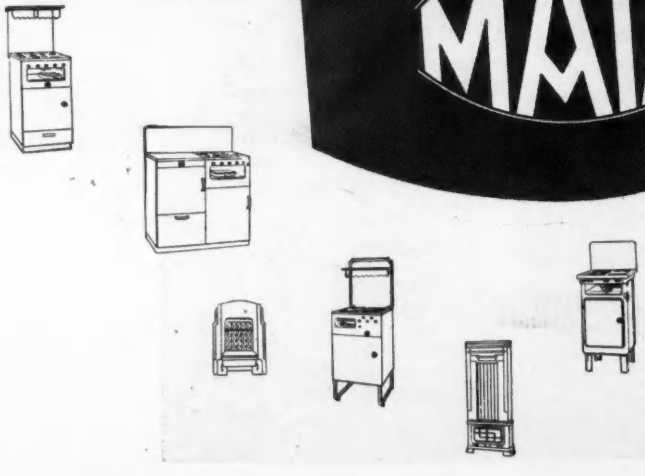

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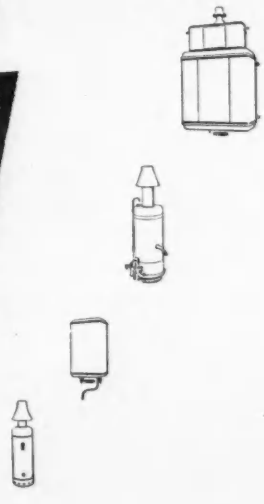

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COMPANY NEWS

William Sugg & Co., Ltd.

Accounts for year ended June 30 show balance brought forward from revenue account £47,791 (£62,238), plus interest £2,807 (£2,663), making £50,598 (£64,901). After depreciation £7,996 (£5,985), employees bonus £5,161 (£8,488), superannuation scheme £4,878 (£2,700), taxation £16,263 (£19,857), etc., net profit £15,880 (£27,159). Dividend 10% and bonus 15%. £15,116 net (same), forward £34,805 (£34,041). Directors' emoluments £14,468 (£16,254). Meeting, St. Ermin's Hotel, Caxton Street, Westminster, November 29, immediately following an extraordinary meeting at noon in connection with an alteration in the articles.

South Australian Gas Company

In submitting the year's accounts at the annual general meeting of the South Australian Gas Company on August 31, the Chairman of Directors (Mr. F. G. Scarfe) said that the disastrous strike in the New South Wales coalfields during the months of July and August last year considerably affected the financial results, and, in order to maintain the usual 5% dividend, which they had paid every year, with one exception, for the last 16 years, it was necessary for the directors to use part of the company's reserves. It was estimated that the strike cost the company £76,550. Increased cost of coal with higher rates for wages and materials also affected the results. Although revenue advanced from £1,141,208 to £1,153,485, costs of manufacture were £76,946 higher at £793,683, while distribution charges rose £14,673 to £177,403.

Cochran & Co., Annan.

The 48th annual general meeting of Cochran & Co., Annan, Ltd., was held on November 7 at the registered office, Annan. Mr. R. P. W. Adeane, the Chairman, said: The net profit for the year showed a moderate increase at £66,000, as against £58,000 last year, and this has enabled your directors to recommend maintenance of the dividend at last year's rate of 9%, free of tax, to allocate £35,000 to general reserve, bringing that reserve to £140,000, and to add £5,000 to the retirement benefit fund, thus making provision for a good many years to come. After the above allocations our carry-forward stands at £21,431, against £10,301 last year. Although the company's reserves and carry-forward, excluding the sum reserved for retirement benefits, at £173,000 approach the issued capital of the company, these reserves are by no means too large. The replacement value of our works buildings, plant and equipment is vastly greater than the very moderate £137,000 at which they stand in the balance sheet. The capital actually employed in the business based on replacement values on which a trading profit of £179,000 was earned may well be at least three times the issued capital of the company. It is, I think, important to stress this point as, otherwise, the wholly exemplary habit, followed by companies of standing, of not writing up their assets does at times make their trading profit appear unduly large.

Cannon Iron Foundries

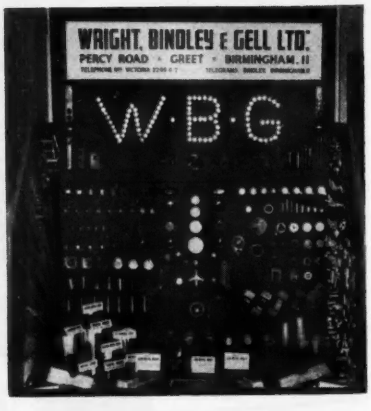
Net profit for year to June 30, after all expenses, £406,371 (£320,458), deduct tax £216,368 (£173,960), leaving £190,003 (£146,498) plus £52,361 tax provisions no longer required. Goodwill figure on balance sheet since 1935 at £206,006 has been written off. Final dividend 10% (on Ordinary capital as increased by bonus issue of 80,000 10s. shares), making 15% for year requires £23,650. (Last year 15% paid absorbed £21,450). Dividend 5¼%. Preference £6,050 (same), forward £84,680 (£78,022, after £100,000 to reserve). The dividend is more than seven times covered, and the *Financial Times* comments that many shareholders will consider this to be carrying prudence to extremes, though prudence is not an attribute to be despised in certain circumstances. If it is dictated by the financial needs of the business—although no shortage of liquid resources was indicated by the June, 1949, balance sheet—or by a desire for dividend stability, then the Board's policy will be adjudged reasonable. The total reserves, minus the £40,000 capitalised and allowing for the elimination of goodwill, now exceed £332,000, compared with the increased capital of £500,000.

Gas Supply Company

At the annual meeting in Melbourne on September 27, the Chairman (Mr. R. A. Schuchard) said that the year had been most difficult for all Australian gas companies. This was due principally to the coal strike which spread over the months of July and August, 1949, and which followed a period of short supply of coal due to last year's floods at Maitland. During those months, the company managed to supply hospitals and other public institutions with gas by the use of substitutes for coal, and also supplied a rationed quantity of gas to all consumers. The loss of revenue was very considerable, and the costs of the work necessary to meet the conditions created were very high. In addition, the lag between increases in costs and in approval being granted for higher prices affected the profits. In all the circumstances, the final dividend of 4% p.a., making the rate for the year 3¼%, is as good as could be expected. In order to place the current liabilities on a better long-term basis, a debenture loan of £250,000 with interest at 4¼% p.a. for 10 years has been arranged with the Australian Mutual Provident Society. It will be used to repay the bank overdraft and most of the deposits. In spite of the difficulties created by short supplies of coal and shortages of manpower, the prospects of the gas industry are very bright. The demand for gas in new houses, and for additional purposes in existing homes, is increasing as new and improved gas appliances are available. The sales of appliances during the year were almost the same as for last year in numbers but much greater in value. Sales of gas during the first half of the year were seriously affected by the coal strike. They were 12% below the corresponding period of last year. In the second half, sales were 1½% above those for the corresponding half of last year. The demand for the by-products, coke and tar, far exceeded the supply.

George Wilson Gas Meters.

The 14th ordinary general meeting of George Wilson Gas Meters, Ltd., was held on October 31 at Coventry, Mr. W. D. Wilson B.E.M. (Chairman and Managing Director), presiding. The Chairman said that although the personnel of the industry remained as in the past, new methods and practices had been introduced which inevitably had had the effect of restricting for a time at least the value of incoming orders. The consequent diminution in turnover resulted in a substantial reduction of the component producing staff at the Jarrow factory. The order book position then fortunately improved, but this created a considerable problem at that factory in the training of new workers. It was a time of intensive competition but they could justifiably face the future with quiet confidence. The profit of the subsidiary company had fallen slightly compared with the previous year. The report and accounts were adopted and a dividend of 15%, less tax, was approved. Net profit for the year ended March 31, after charging all administration expenses, was £15,659 (against £17,904), and the carry forward is £5,421 (£5,711). The consolidated profit and loss account shows profit earned by subsidiary company at £725 (£1,131). Total profits of the group were £16,384 (£19,035). A further transfer of £2,000 to general reserve brings that account to £35,000.



A remarkable display of light metal pressings and stampings, hot brass pressings, and a range of finished and semi-finished fittings was staged by Wright, Bindley, and Gell, Ltd., Birmingham, at the recent Purchasing Officers' Association exhibition at Brighton. Included in the display were cold rolled brass, copper alloy, and aluminium strip and non-ferrous metal ingots. Emphasis was laid on the fact that the components shown carried no special finish but were just representative of the company's general productions. The photograph gives an impression of the general layout, the versatile activities of the company, and the wide range of industries served.

JEAVONS
E. & CO. LTD.
TIPTON • STAFFS

CONTRACTORS FOR GAS
MAINLAYING

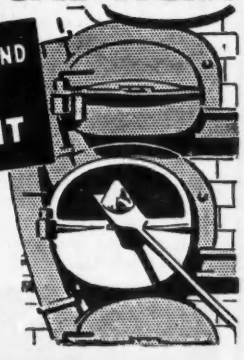
'Phone: TIPTON 2161 'Grams: "PIPELINES"
(5 lines).

Foliac

GRAPHITE PRODUCTS LTD.
LONDON, S.W.11.

RETORTS MADE GAS TIGHT
when patched with—

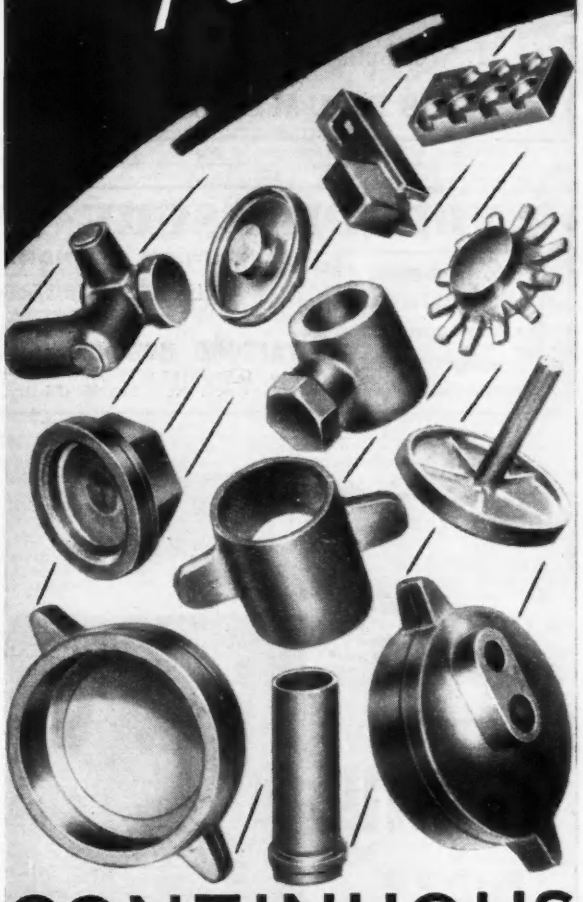
ONX SUPER 83 BRAND FIRE CEMENT



A recent testimonial from Gas Dept.
"We are pleased with results obtained after using ONX Super '83' Brand.
"Our settings were very bad, with large cracks in retorts, and portions of wall actually collapsed.
'Now, six months after repairing 28 retorts they appear as sound as ever; we anticipate the life of the settings will be prolonged."

A. L. CURTIS & CO., Westmoor Works, CHATTERIS, Cambs., Eng.

MESSENGERS'
Hot Brass Pressings



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See our Advertisement Next Week.
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BARCLAYS BANK CHAMBERS, OWEN STREET, TIPTON, STAFFS.
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INSTRUMENTS for Works and Laboratory.

CALORIMETERS:
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For low and high C.V.

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ALL TYPES OF DISTRIBUTION MATERIAL IN STOCK
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SPLIT COLLARS
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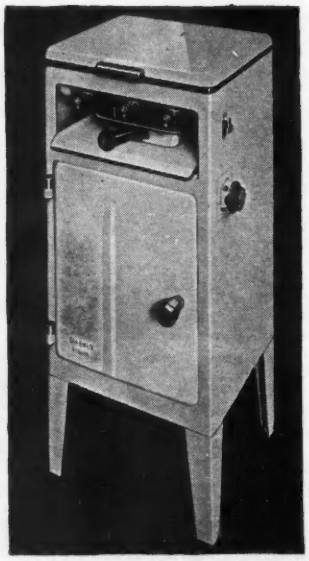
For small Kitchens and Flats...

The **Dainty** MINOR



This efficient little cooker of large capacity is made especially for small kitchens and flats.
Its cast-iron construction ensures durability and low maintenance cost.
For hire purchase or for simple hire The 'Dainty' Minor is ideal.
Approved and adopted by leading gas boards.
Leaflet fully describing this efficient, attractive and economical cooker will gladly be sent.

R. RUSSELL & SONS LTD. DERBY

Agents for Scotland and Northern Ireland:
JAMES R. THOMSON & CO., LTD., 10 Blythswood Street, Glasgow, C.2

AH— TISHOO!

Coughs and colds spread like wildfire and are a serious cause of ABSENTEEISM.
We can help you to combat and confine infection with our preparations, some of which are listed below.
Send for particulars and prices.

★ SYRUP PINI. CO. CUM KREOSOTE. This is very palatable, has a powerful antiseptic effect against the persistent cough, and diminishes the risk of infection spreading.
★ "QUINCABEL" FOR COLDS. Assists in arresting the development of a cold or in its dispersement.
★ "G.P." GERMICIDE AND ANTISEPTIC. An essential as a general infection combatant.
★ "AMARATONE" TONIC. A first-class tonic when vitality is low, for building up resistance to infection.
★ A.P.C. TABLETS. (Aspirin, Phenacetin, Caffein). A splendid prophylactic in cases of pains and colds.
★ "SANOID" ANTISEPTIC SPRAYING SOLUTION. A pleasant and effective anti-infection spraying solution.
★ IODISED THROAT TABLETS. An effective means of disinfecting the mouth and throat and reducing infection spreading.

CUXSON, GERRARD & CO. LTD.
SPECIALISTS IN FIRST AID
OLDBURY, BIRMINGHAM Phone Broadwell 1355

PUBLISHERS' NOTICE

The "Gas Journal" is published every Wednesday, price 1/-; by post 1/2d.

Subscription Rates: Home and Empire :- 45/- per annum; Foreign :- 52/- per annum. (Both payable in advance.) A copy of the "Gas Journal" Calendar & Directory is presented each year to continuous subscribers.

Classified Advertisements: All small classified advertisements are charged at 1/6 per line (approx. 7 words) - minimum charge 7/6. A Box Number address occupies 2 lines, and a further 6d. is charged towards cost of postage on replies. Copy must be received by first post on Monday to ensure insertion in that week's Journal.

Displayed Advertisements: Rates obtainable on application to the Business Manager. Change of copy for displayed spaces must be received 14 days prior to publication if proofs are required. Type area of inside pages 10" deep x 7" wide; block screen 120.

BUSINESS MANAGER: S. T. CULLEN

MIDLANDS OFFICE: 10, Union Street, Birmingham.

NORTHERN MANAGER: W. Q. Foster, 33, St. Helens Road, Harrogate. 'Phone: Harrogate 84291.

WALTER KING, LTD., 11, Bolt Court, Fleet Street, London, E.C.4.

Telephone: CENtral 2236-7. Telegrams: Gasking, Fleet, London.

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DUTCH AND DANISH BOG ORE
SPECIALLY ACTIVATED OXIDE OF IRON

Oxide supplied on loan or sale outright.
Highest prices paid for Spent Oxide.

Send your enquiries to

GAS PURIFICATION & CHEMICAL COMPANY LIMITED
ESTABLISHED 1873

PALMERSTON HOUSE, OLD BROAD STREET, LONDON, E.C.2.

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THE COOKER CLEANER

Tins for Sale to Consumers. In Bulk for Works Use

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DRAUGHTSMAN with sound knowledge of gasworks and allied chemical plant design required. Age 35 or upwards. Pension scheme. Permanent position to suitable applicant.

Fullest details of experience, age and salary, to R. & J. DEMPSTER, LTD., Gas Plant Works, Manchester 10.

EAST MIDLANDS GAS BOARD

NOTTS AND DERBY DIVISION.
NOTTINGHAM UNDERTAKING.
BEESTON SHOWROOMS.

APPOINTMENT OF ASSISTANT SALESMAN.

APPLICATIONS are invited from suitably qualified persons for the appointment of ASSISTANT SALESMAN at A.P.T. Grade III (£250-£400 per annum), commencing salary to be in accordance with age and qualifications.

The candidate selected will be responsible to the Senior Salesman and should be experienced in window dressing, display and promotion of the sale of gas and coke burning appliances in the showrooms and on the district.

The successful applicant will be required to pass a medical examination and the appointment will be subject to such superannuation scheme as may be adopted by the Board.

Applications, stating age and giving full particulars of training, qualifications and experience, together with the names of two referees, should be addressed to the undersigned for receipt within 10 days of the appearance of this advertisement.

K. L. PEARCE,
Divisional General Manager.

East Midlands Gas Board,
Notts and Derby Division,
Friar Gate,
Derby.

LADY required for duties in London showrooms of gas appliance manufacturer. Must have personality and preferably have had experience in the gas industry. Apply in own handwriting, stating age, experience, salary required and include references, to No. 9938, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

BOMBAY GAS CO., LTD.

ASSISTANT MANAGER AND ENGINEER.

APPLICATIONS are invited for the above appointment.

Salary equivalent to £1,500 per annum, plus dearness allowance equivalent to at least £180 per annum. Five-year contract in first instance. Provident fund in operation. Passages paid.

Apply, stating full qualifications and experience, age and whether married or single, to Sir Alexander Gray, Broad Street House, 54, Old Broad Street, London, E.C.2.

NORTHERN GAS BOARD

NEWCASTLE DIVISION.
HOME SERVICE ORGANISER.

APPLICATIONS are invited for the position of HOME SERVICE ORGANISER.

The successful candidate should hold a recognised diploma in, and have practical experience of, cookery and domestic science and be capable of organising and developing the work of a department engaged in cookery demonstration and the indirect promotion of gas sales and service.

The salary will be within Grade VIII, A.P.T. (£392-£456) according to qualifications and experience.

The successful applicant will be required to pass a medical examination and the appointment will be subject to any superannuation scheme that may be made for the gas industry.

Applications, stating age, qualifications and experience, together with details of present and previous appointments, giving the names of two referees, should be addressed to the undersigned as soon as possible.

J. E. WHITE,
Divisional General Manager.

30, Grainger Street,
Newcastle-upon-Tyne, 1.

(Classified advertisements continued on Supplement 4)

PHOTOGRAPHY . . . . . .

SPECIAL quotations for

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APPLICATIONS are invited from young men aged approximately 24 to 30 for appointment as PLANT OPERATING ENGINEER in the chemical engineering and gasworks plant department of Newton Chambers & Co., Ltd., Thorncliffe, near Sheffield. The appointment will involve plant supervision in various parts of the country, including starting up and performance testing. Previous experience in the operation of gasworks by-product plant particularly tar distillation plant will be an important advantage. Apply in writing to the Personnel Officer, stating age, qualifications, salary required and when at liberty.

WALES GAS BOARD

NEATH UNDERTAKING.

APPLICATIONS are invited for a TECHNICAL ASSISTANT in the above undertaking.

Applicants should have a sound training in gas engineering and hold a Higher Grade Certificate of the Institution in Gas Engineering (Manufacture). They should have had experience in the operation of continuous vertical retorts and water gas plants.

The salary will be in accordance with Grade VII of the Board's Scale of Salaries (£450 to £530 per annum).

Successful candidate will be required to pass a medical examination and will be subject to the provisions of any superannuation scheme which the Board may introduce.

Applications, stating age, training, qualifications and experience, accompanied by the names of two referees, should be made to the undersigned not later than November 27, 1950.

G. FITTON,
Engineer and Manager.

Gasworks,
Millands,
Neath.

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KINGS PATENT AGENCY, LTD.
(Director, B. T. King, A.I.M.E., Patent Agent)
Advice, Handbook, and Consultations free. 146a, Queen Victoria Street, London, E.C.4. Phone: City 6161.

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FOR PUBLIC LIGHTING.
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PAYNE & FLOOD, LTD., 182, Oldham Road, Manchester, 4, Phone Col. 1393, are in a position to undertake all types CARBONIZING PLANT REPAIRS, Retort House Reconstruction, Producer Relinings, Hot and Cold Patching, Structural Steelwork Erected and Dismantled. Expert advice available

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CAN BE REACHED
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GAS PURIFYING MATERIAL
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OFFER THE FOLLOWING TANKS FOR DISPOSAL EX STOCK.

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One 10 ft. by 12 ft. One 10 ft. by 11 ft. 9 in. One 10 ft. 6 in. by 11 ft. One 9 ft. by 11 ft. 6 in. Four 9 ft. by 9 ft. Two 6 ft. by 7 ft. One 6 ft. by 6 ft. One 5 ft. by 5 ft. One 4 ft. by 5 ft.

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One 15 ft. by 11 ft. 6 in. by 11 ft. 10 in. One 13 ft. by 12 ft. 4 in. by 8 ft. Five 14 ft. 6 in. by 12 ft. by 6 ft. Two 14 ft. 9 in. by 12 ft. by 6 ft. Four 13 ft. by 6 ft. by 8 ft. One 12 ft. by 9 ft. by 5 ft. 6 in.

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One 22 ft. 6 in. by 12 ft. by 8 ft. One 12 ft. by 12 ft. by 13 ft. One 12 ft. by 12 ft. by 12 ft. 6 in. Two 12 ft. by 12 ft. by 12 ft. 3 in. One 11 ft. 11 in. by 11 ft. 11 in. by 11 ft. One 10 ft. by 9 ft. 10 in. by 11 ft. 6 in. One 9 ft. 10 in. by 9 ft. 10 in. by 11 ft. 6 in. One 10 ft. by 10 ft. by 10 ft. 2 in. One 12 ft. by 5 ft. by 6 ft. One 13 ft. by 5 ft. by 5 ft. 6 in. One 6 ft. by 5 ft. by 5 ft. One 5 ft. by 5 ft. by 4 ft. One 3 ft. 4 in. by 3 ft. 6 in. by 3ft. 3in.

JAMES N. CONNELL, LTD.,
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COATBRIDGE, SCOTLAND.
Telephone Coatbridge 1121 (5 lines).

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FOR
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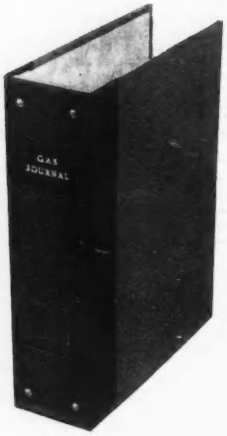

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Price 12/6 each plus 9d. postage.

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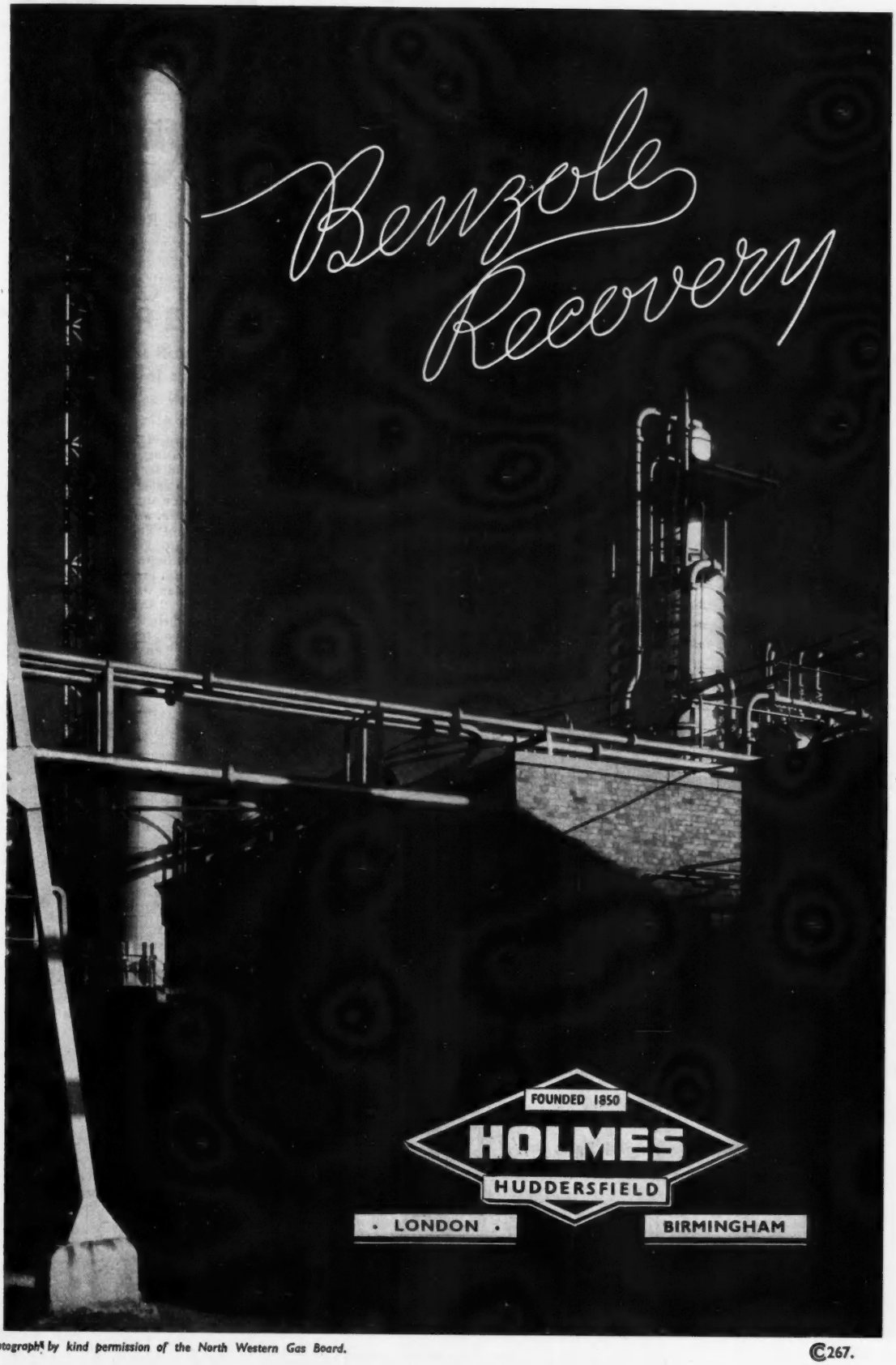

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C267.

A "Keith-Blackman" Induced Draught Fan in Operation.

VENTILATION — HEATING

GAS BOOSTING and EXHAUSTING — MECHANICAL DRAUGHT

FURNACE RE-CIRCULATING

FORGE and FURNACE BLAST — COLD AIR DOUCHE

MAN-COOLING — DRYING

WE make all types of Fans—"High Efficiency" for boosting or exhausting gas up to 3 lbs. p.s.i. and for volumes from 5,000 to 1,500,000 cfph; Cast Iron and Steel-plate "Pressure" fans for up to 2 lbs. p.s.i. air blast to furnaces, forges, water gas plants, burner equipment, etc; "Turbo" fans for applications requiring up to 6 lbs. p.s.i.; "Centrifugal" fans for draught on boiler fires to ensure economical steam production, or for cold air douche to workers in retort houses, etc.; "Centrifugal" or "Axial" fans for supplying ventilating air through ductwork; "Propeller" fans for moving air in volume for ventilating; "Propeller" fans on portable structures for cooling workers at furnace fronts; and "Tenaxe" fans for re-circulating high temperature gases and air in various types of heat treatment furnaces.

"KEITH-BLACKMAN"

FANS *for every purpose*

for which fans are essential.

When you need Fans for moving air or gas give us an opportunity of making practical suggestions.

FAN MANUFACTURERS' ASSOCIATION LIMITED

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SCOTLAND: 90 Mitchell Street, Glasgow, C1. TN: Central 7973. IRELAND: 7 Brunswick St. Belfast. TN: Belfast 21114.
SOUTH WALES: 127 Stanwell Road, Penarth, nr. Cardiff. TN: Penarth 249.

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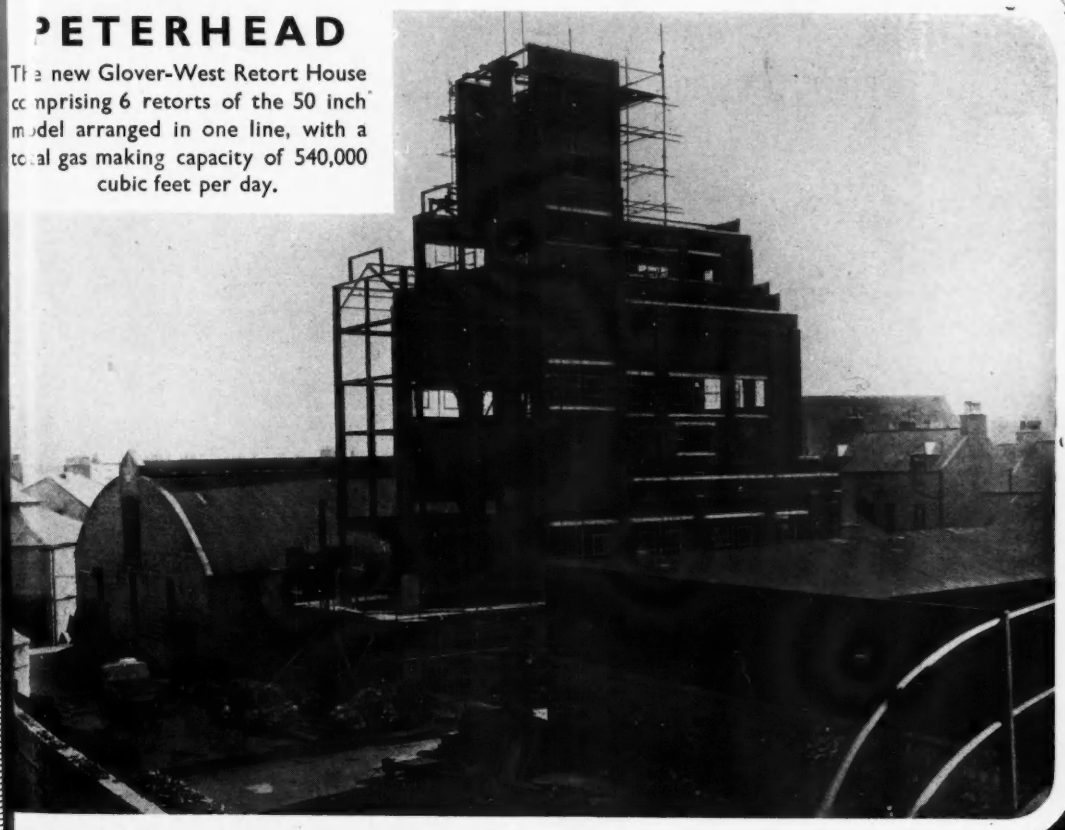
Work in progress

PETERHEAD

The new Glover-West Retort House comprising 6 retorts of the 50 inch model arranged in one line, with a total gas making capacity of 540,000 cubic feet per day.

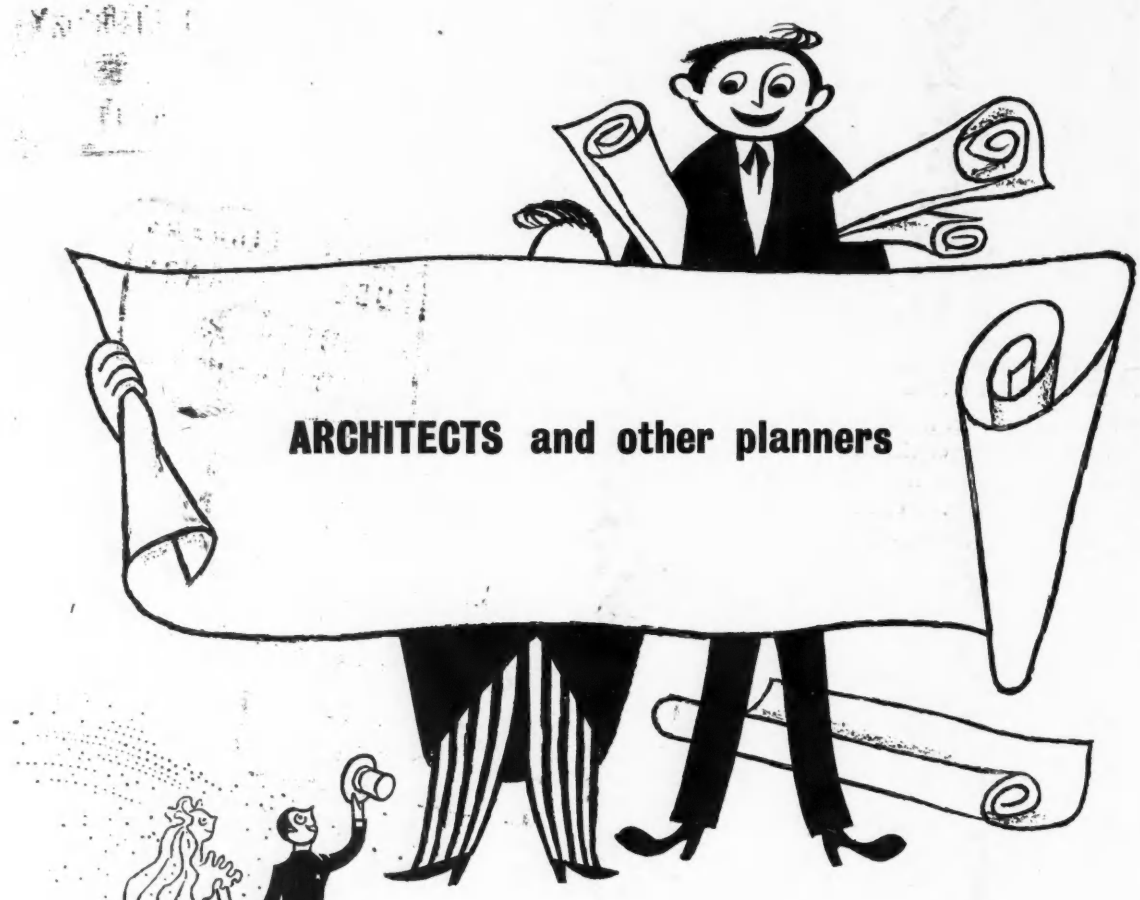


West's Gas IMPROVEMENT CO., LTD.

MILES PLATTING, MANCHESTER, 10

Telephone: COLlyhurst 2961-5. Telegrams: Stoker, Manchester.

London Office: COLUMBIA HOUSE, ALDWYCH, W.C.2. Telephone: HOLborn 4108-9. Telegrams: Wesgasco, Estrand.



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MANY ADVANTAGES commend an Ascot hot water supply to architec and other planners. Ascots are easy to site and economical t instal, and lend themselves admirably to the modern practice o using pipe ducts or service cores.

No expensive storage space has to be provided for solid fuel which are bulky and dirty, and the designer knows that whatev the flat-dweller's demand for hot water, Ascot will meet it instan taneously. Only instantaneous gas water heaters will give a adequate supply that never runs cold.

ask ASCOT

The Ascot technical department possesses wide experience of hot-water planning. Its officers are freely available for consultation.

ASCOT GAS WATER HEATERS LTD., 43, PARK STREET, LONDON, W.